

# The Chemical Age

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## Contents

	PAGE
EDITORIAL NOTES: Du Pont—I.C.I.—Billingham; The Cut in Dyestuff Prices; The Five-Day Working Week: I.G. Finance .....	115
Petroleum as a Source of Synthetic Material .....	118
Low Temperature Carbonisation and Coal Liquefaction: Dr. Lander's Third Cantor Lecture .....	120
The Control of Science .....	122
Chemical Matters in Parliament .....	125
From Week to Week .....	126
References to Current Literature .....	127
Patent Literature .....	128
Weekly Chemical Prices and Market Reports .....	132
Company News .....	136
Commercial Intelligence; New Companies Registered; New Trade Marks; Chemical Trade Inquiries .....	138
DYESTUFFS MONTHLY SUPPLEMENT: The Standardisation of Tests for Fastness to Light, etc. ....	9-16

**NOTICES:**—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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## Du Pont—I.C.I.—Billingham

A NEWS item of quite unusual interest reaches us from an American source that is generally trustworthy. It is to the effect that the well-known du Pont organisation of the United States and Imperial Chemical Industries of Great Britain are jointly concerned in the development of chemical works in Australia, and that certain British lead interests are also co-operating. If this is true, the announcement indicates a further step towards silencing any thoughts of suspicion or antagonism between British and American interests, beyond the ordinary industrial competition between friendly peoples. In some quarters it has been hinted that in the synthetic nitrogen field the two leading British and American firms were bound to clash in their competition for markets. On the other hand, the du Pont and the Nobel interests have for a long time been on the most friendly terms, and have been able to co-operate in several directions. The Duco finishes of the one concern are, we believe, very much like the Belco finishes of the other. It is not to be expected that throughout the whole chemical industry there is going to be complete co-operation between Great Britain and America. Competition there must

be, but it is important that the competition should be of the most friendly character, and occasional understandings and actual co-operation between the most powerful concerns on both sides are the best possible means of ensuring such friendship.

Meanwhile the development of the synthetic nitrogen industry in this country proceeds without the least fear apparently of consumption failing to keep pace with output. Apart from the large additions made to the plant at Billingham, the main concern at present there is the provision of good transport and shipping facilities. These, judging from statements made by Colonel Pollitt in a recent speech, are at present far from satisfactory—so unsatisfactory, indeed, that Synthetic Ammonia and Nitrates, Ltd., have already approached the Tees Commissioners with proposals for the construction of their own docks. No details have been made public; but it is evident that so large and progressive a concern requires facilities under its own control and designed to meet its own needs. Such applications frequently meet with obstruction from vested interests which think more of their own profits than of the promotion of new enterprises. The Tees Commissioners, however, must be aware of what an important factor Billingham has already become in national and international chemical industry and of the immense possibilities yet before it, and they will be acting wisely in their own and in the national interests by giving the great developments at Billingham all the help they can.

## The Cut in Dyestuff Prices

THE important cut in dyestuffs prices announced in our *Dyestuffs Monthly Supplement* a month ago has naturally been the subject of considerable discussion in the trade. The independent makers appear to have their own views on the objects of the policy, and there is a hint in our market reports to-day that they may be induced to act more collectively in their own interests. As to the scheme itself, there can be no doubt that it contains good features. At the first annual meeting of Imperial Chemical Industries attention was drawn to the practice of inviting customers to estimate their requirements in kind and in quality beforehand, and thus enable the manufacturers to proceed on reasonably sure ground. The present scheme provides that when the consumption exceeds a certain figure the standard prices of dyestuffs are reduced, and, further, where the total annual consumption exceeds a certain limit, there will be a bonus "in kind" of 5 per cent. and 6 per cent. Some of the larger users, it is said, feel that the new terms do not give sufficient advantage to the large dealer, but if the advantage were made too great it might affect

the existence of the smaller consumers, whose custom the makers have no desire to lose.

The user, of course, welcomes any tendency to lower prices, and any special concessions to bulk buying, but he, in his turn, has to reckon with the textile manufacturer or merchant whose goods he dyes, and who, when he hears that dyes are cheaper, naturally expects to see the reduction reflected in lower dyeing charges. So far the dyers have not announced any general reduction in their prices, a point that will not be overlooked by those who contend that the dye cost in proportion to the total fabric cost is far less important than is sometimes made out. It may be noted that indigo is not included in the new regulations.

### The Five-Day Working Week

It is several years now since Benn Brothers, Ltd., instituted the five-day working week, which gives all their staff the advantage of a clear Saturday and Sunday every week. In this, as in many other matters, the firm led the way, not only because it believed the reform to be intrinsically good, but in the hope also that city firms would be induced to follow this progressive example, until the practice became general. As the result of Benn Brothers' lead, the practice of the five-day week is considerably less rare in London to-day than it used to be, but it is still far from general, as the number of futile telephone and personal calls at Bouverie House on Saturday mornings still testifies. It may safely be claimed that the five-day week firms in London represent the most progressive in their various industries, and it is the general efficiency of their management which enables them to eliminate the Saturday morning from the working week and give their staffs the much-prized clear two-day week-end. The laggards, however, are rather a drag on their more progressive neighbours. If they are too slow to see the advantages of a shorter working week and a correspondingly brighter, happier, healthier and more enthusiastic staff of workers, they can at least refrain from wasting the sluggish Saturday morning hour in ringing up offices whose work was cleared up on Friday evening, and whose staffs are healthily enjoying their week-end leisure and recreation.

### I.G. Finance

AN account was recently given in these columns of the reports, emanating from various sources, of the intention of the I.G. to form an American holding company. It now appears that for various reasons, among which the unfavourable American market situation is cited, this plan has (perhaps only for the time being) been abandoned. The earlier reports indicated that there was some connection between the American holding company and the company founded a short time ago in Switzerland, the Internationale Gesellschaft für Chemische Unternehmungen of Basle. An official statement by the I.G. to its shareholders now throws some light on the activities of the Swiss company (which is given the significant abbreviated title I.G. Chemie Basle).

The holdings of the Swiss company are to be extended much further, and the German I.G. will have an interest in the holdings. For this purpose, the share capital of the Swiss company is to be increased from 20 million

to 250 million Swiss francs. The shareholders of the German I.G. will have the right to subscribe to the new shares on the basis of one new share for every fifteen shares held at present. The German I.G. will guarantee to the Swiss company the payment of a dividend on the latter's ordinary shares equal to that on its own. On the expiry of the agreement, at the end of 1938 at the earliest, the shareholders of the Swiss company will be entitled to exchange their shares for those of the German I.G. These proposals are to be submitted to an extraordinary meeting of I.G. shareholders on February 20.

The exact purpose of all these manoeuvres remains a mystery, but it is surmised that they are a means of providing for future capital requirements, in which foreign capital will participate.

### Books Received

- MATTHEW MURRAY. By E. Kilburn Scott. Pp. 132. 2s. 6d.  
 PRACTICAL PRIMARY CELLS. By A. Mortimer Codd. London: Sir Isaac Pitman and Sons, Ltd. Pp. 127. 5s.  
 ORGANIC LABORATORY METHODS. By the late Professor Lassar-Cohn. Translated by Ralph E. Oesper. London: Baillière, Tindall and Cox. Pp. 468. 30s.

### The Calendar

Feb.		
9	Mining Institute of Scotland: General Meeting. 3 p.m.	79, Grassmarket, Edinburgh
11	Ceramic Society: "Heat Resisting Steel for Kiln Supports." "Flow of Heat in Furnace Walls." J. Sarjant. 7.30 p.m.	North Staffordshire Technical College, Stoke-on-Trent
11	University of Birmingham Chemical Society: "Some Stereochemical Problems." Dr. W. H. Mills.	University, Birmingham
12	Institution of Petroleum Technologists. 5.30 p.m.	John Street, Adelphi, London.
12	Institute of Metals (N.E. Coast Section): "Metallurgy of Engineering." J. E. Newson. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne
13	Institute of Fuel. "The Coal Burning Art as applied to Steam Production." W. D. Wylde.	London
14	Institute of Metals (Scottish Section): "Alloys: Past, Present and Future." Dr. W. Rosenhain. 7.30 p.m.	39, Elmbank Crescent, Glasgow
14	Institute of Metals (London Section): "Some Present Day Metallurgical Tools and Methods." 7.30 p.m.	83, Pall Mall, London
14	Leicester Literary and Philosophical Society (Chemistry Section): "The Photosynthesis of Carbohydrates from Carbonic Acid." Professor E. C. C. Baly. 8 p.m.	University College, Victoria Road, Leicester
14	Oil and Colour Chemists' Association: "The Fresco Ordeal: its Chemical and Artistic Implications." T. Wilson. 8 p.m.	Royal Society of Arts, John Street, Adelphi, London
14	Optical Society. 7.30 p.m.	Imperial College of Science and Technology, London
14	Society of Chemical Industry (Bristol Section). "Some Chemical Aspects of Tinplate Making." Dr. C. A. Edwards. 7.30 p.m.	University, Woodland Road, Bristol
14	Society of Chemical Industry (Birmingham Section): "Disposal of Ammonia Liquors." Dr. W. Parkes. 7 p.m.	Engineers' Club, Waterloo Street, Birmingham.
15	Oil and Colour Chemists' Association and Society of Dyers and Colourists (Manchester Section): "The Ostwald Colour System." F. Scholefield.	Manchester
15	Royal Institution of Great Britain: "Chemi-luminescence." Dr. E. K. Rideal. 9 p.m.	21, Albemarle Street, London
15	Society of Chemical Industry (Glasgow Section): "Chemical Studies of Coal Tar Products." Dr. G. T. Morgan.	207 Bath Street, Glasgow

## Official Changes in Imperial Chemical Industries



MR. J. H. WADSWORTH, SECRETARY OF IMPERIAL CHEMICAL INDUSTRIES SINCE ITS INCORPORATION, APPOINTED TO THE BOARD AND EXECUTIVE COMMITTEE OF THE COMPANY.

MR. P. C. DICKENS, APPOINTED TO SUCCEED MR. WADSWORTH AS SECRETARY OF THE COMPANY.



## Petroleum as a Source of Synthetic Material

### Dr. Dunstan's Paper before the Society of Chemical Industry

*At a meeting of the London Section of the Society of Chemical Industry held at Burlington House, London, on Monday, Dr. A. E. Dunstan read a paper on "Petroleum as a Source of Synthetic Material." Mr. W. J. A. Butterfield (chairman of the Section) presided.*

BEFORE Dr. Dunstan commenced to read his paper, Mr. W. J. A. Butterfield, who retires from the chair of the London Section of the Society of Chemical Industry at the annual meeting in May, announced that the council had unanimously invited Professor G. T. Morgan, head of the Chemical Research Laboratory at Teddington, to succeed him, and that Professor Morgan had accepted their nomination.

Dr. Dunstan said in his paper that within the last few years there had been a greater and greater tendency to regard petroleum as the potential source of a new chemistry. Statements were often made in the Press as to the imminent end of petroleum as a source of fuel energy, but the fact was that in the course of the last 70 years there had been extracted from the earth's crust, by more or less adventitious and haphazard methods, not more than two-thirds of one cubic mile of mineral oil, and it was therefore reasonable to look forward, by the use of scientific methods, to the production of increased amounts of mineral oil from the subterranean sources of the earth; and to anticipate that this enormous amount of raw material, to the extent of 150 million tons per annum, would be the source of a vast quantity of synthetic materials.

#### Endowment of Research by American Oil Interests

That view was substantiated by recent endowments of research in America, where the oil interests had during the past few years subscribed 500,000 dollars for fundamental research in petroleum. The mere statement of the projected researches into the nature of petroleum indicated very clearly what this beneficent bequest was likely to achieve. The work was being carried out under the auspices of the American Petroleum Institute, which had formed a committee to administer the grant. At the present moment, work was being carried out on catalysis applied to the decomposition of petroleum hydrocarbons; on the effect of electric discharge on gaseous hydrocarbons; on the relation of oxidation to detonation in the internal combustion engine; on the preparation of pure, typical petroleum hydrocarbons; on the isolation of the multitudinous sulphur derivatives occurring in petroleum; on the thermal decomposition of petroleum hydrocarbons, and on the rates of reaction of the olefines with various reagents. All this fundamental research must ultimately give us a new chemistry based on the paraffins, just as to-day we had a chemistry based on the aromatic hydrocarbons.

There were four definite avenues of approach to the production of new materials from paraffin hydrocarbons, namely: (1) Cracking; (2) chlorination; (3) various methods of oxidation; and (4) a variety of methods which must be classed as miscellaneous.

#### The Cracking of Hydrocarbons

With regard to cracking, the work that had been done had demonstrated that although hitherto it had largely been thought that the radicles  $\text{CH}_3$ ,  $\text{CH}_2$  and  $\text{CH}$  had a fugitive existence, this fugitive existence might be extended long enough to give these materials the chance of further combination and condensation. Work in this direction had recently been described in a paper by Franz Fischer, but although this paper of Fischer's had received prior publication, the fact was that similar work had been going on in the laboratories of his (Dr. Dunstan's) own company for the past six years, and even as far back as 1902 it was realised that there were possibilities in extending the early work of Berthelot and Haber into the pyrolysis of simpler paraffin materials.

Therefore, in collaboration with Professor Wheeler and his staff in Sheffield, work was set going six years ago into the possible decomposition of methane, ethane, propane and butane. Wheeler had shown that from 1,000 c.f. ft. of natural gas—mainly methane—it was possible to obtain 0.25 gallons of aromatic hydrocarbons, and had also demonstrated that Berthelot's original work was done with a time factor too long. If the time factor was deliberately restricted, the nascent radicles  $\text{CH}_3$ ,  $\text{CH}_2$  and  $\text{CH}$  began to re-combine to form

aromatic hydrocarbons to the extent he had indicated. This work had been put on to a practical scale in America, where to-day there was produced 1 million million c. ft. of natural gas, and an enormous number of products were being made from it. Wheeler's work in this matter took second place to his work on the decomposition of ethane, and he had found that from 1,000 c. ft. of natural gas containing only 48 per cent. of ethane, it was possible to obtain 2 gallons of aromatic hydrocarbons.

The point was that to-day, in every oil field in the world, there were waste gases available which offered the possibility of producing tremendous quantities of aromatic hydrocarbons, especially when they considered the possibilities of the thermal decomposition of propane and butane. In America, at the present time, some cracking was being done for the production of olefines. At a temperature of  $1,000^\circ\text{C}$ . methane was broken down to aromatic hydrocarbons. Ethane required a temperature of  $750^\circ\text{C}$ ., but if the temperature was somewhat lower, about  $700^\circ\text{C}$ ., then ethane, propane and butane would give mainly olefines.

#### Glycol and its Derivatives

Continuing, Dr. Dunstan referred to the type of work that was being carried out in that connection in America, especially mentioning the Carbide and Chemical Co. of New York, and the Sharples Co., of Philadelphia, as typical of the policy adopted in the United States in these matters. The Carbide and Chemical Co., he said, set out some years ago to obtain ethylene as an intermediate product, and last year it produced by this means 1 million lb. of glycol. In addition, a very wide range of materials was being synthesised by this company from this simple material.

What had struck him about America was that the large chemical organisations went ahead of their markets. They were not merely anxious to make stuff that the market wanted at the moment, but they went to great trouble and expense to make materials ahead of market requirements, and then to introduce them to the markets. From that point of view he considered that this country had a great lesson to learn. For instance, the Carbide and Chemical Co. started with glycol, which was at first a chemical curiosity, but now the company supplied no less than six million lb. per annum for use in motor radiators to prevent freezing of the water in cold weather. They also produced three million lb. of dinitro-glycol, which was found to be free from many of the drawbacks of ordinary nitroglycerin, and found a large market in Canada.

Glycol ethers had similarly been produced, and had found considerable use among lacquer manufacturers, especially for nitro-cellulose materials. There was also a whole range of solvent esters and ethers, all of which had been produced first without any demand for them, but a demand had been worked up subsequently, and he could not help feeling that in adopting this policy of a mass attack of money, men and resources, the Americans were bound to score over this country every time. The Sharples Corporation of Philadelphia was fractionating hydrocarbons and attacking the fractions with chlorine. Dr. Dunstan exhibited a large number of the many materials made by the Sharples Corporation.

#### Other Synthetic Materials

It was astonishing, he continued, to find the extent to which these syntheses were progressing in America. In Charleston, Virginia, there was a plant making 300 tons of liquid chlorine per day, the bulk of which was used for the manufacture of synthetic materials of many varieties. Ten to twenty thousand tons of synthetic solvents were manufactured, and the many samples which he had exhibited, made directly from pentane and butane, were practically pure chemical substances. God forbid that he should advertise American products; he called attention to them solely to emphasise the lesson that we must learn. Probably there were not markets for a great many of these materials to-day, but the products were

available and the markets were gradually being developed. Incidentally, Dr. Dunstan mentioned that one of the results of this class of work had been the manufacture of a material consisting of aldehydes, ketones, and acids guaranteed to produce excessive sickness on the part of any person partaking of the mixture, and the United States Government had accepted this as a denaturent for industrial alcohol.

Finally, reference was made to the manufacture of synthetic rubber from petroleum. Twenty years ago Haufman worked out two technically possible methods of obtaining rubber substitute; in the first place via acetylene and acetone, and in the second via para-cresol. The production of both of these substances from the cracking of petroleum or low temperature tars was conceivable, and although the rubber differed from the natural material, in that vulcanisation was difficult, developments of this nature from petroleum were possible.

#### Discussion

The CHAIRMAN suggested the possibility of making use, in the manner suggested by Dr. Dunstan, of methane from sewage. There was also the possibility of utilising the enormous quantities of methane evolved from the faces of most of our coal mines.

DR. W. R. ORMANDY congratulated Dr. Dunstan upon his courage in pointing out what was being done in America and the lesson we ought to learn from it. He said he himself had often done the same thing in reference to Germany, but the only thanks he got was to be told that he was no Britisher. It was, however, somebody's duty to point out that other nations were going ahead of us, and that unless we altered our tactics we should be left behind. The Germans recognised that competition from America, keen as it had been in Europe in the past, was only beginning, because America was going to be a rich and prosperous country, and would make every endeavour to keep her markets in the whole of the world. Our only alternatives were to compete with her or to build a tariff wall system around ourselves and die of inanition behind that wall. Having regard to the comprehensive programme of research laid down in America, he was wondering how far the 500,000 dollars would go.

In Germany, at the present time, they were converting low temperature tars into highly aromatic low-boiling bodies; the I.G. was producing 100,000 tons of synthetic gasolene per annum, and hoped to produce 250,000 tons per annum in a year or two, which would render Germany entirely independent of the outside world, by utilising the brown coal tars produced from low temperature distillation plants, and converting them into aromatic compounds of a similar nature to those described by Dr. Dunstan.

He did not think there was much prospect at the moment of synthetic rubber, especially with natural rubber at 9d. per lb. In addition, there was some peculiar property in natural rubber which it had so far been impossible to introduce into synthetic rubber, and it was that which accounted for the difficulties of vulcanisation.

MR. F. H. CARR strongly urged that British chemists should be given that same support which was given to American chemists, because only by that means would chemists have that extraordinary faith and enthusiasm which was characteristic of American chemists.

#### Work in Great Britain

DR. THOLE said that although Dr. Dunstan had spoken in a most interesting way of the work that was being done in America, it was the fact that a great deal of work of a similar character was being done in this country, although those responsible for it did not give it that publicity which the Americans did. As a matter of fact, he did not believe that this country was very far behind the Americans either as regards the ability being put into the work or the quantity of materials being produced. Plant of the nature to which reference had been made was down in this country long before the Americans did anything, and he was convinced that our knowledge of the subject of pyrolysis was a long way ahead of that of the Americans, although perhaps it had not received the same large-scale application. British chemists were in no way inferior to the Americans, and certainly, speaking for the company with which he was concerned, there was no lack of encouragement, either financially or otherwise, in the work that was being done.

MR. J. ROMNEY said that although Dr. Dunstan's account of American methods were very interesting, they were to a large extent a gamble which the smaller firms, at any rate, in this country could not afford to risk. Reference had been made to two very large American undertakings which had been successful, but would Dr. Dunstan say whether any of the smaller American firms had tried the same methods and gone bankrupt.

DR. S. J. M. AULD said that this country was handicapped by having no crude oil, but the really great field in the direction indicated by Dr. Dunstan was in the unsaturated compounds. In making these, we were not dependent upon the production of a crude oil, and the oil which was imported into this country would provide us with an ample field for making unsaturated compounds from which to manufacture new materials. That was a work which had not yet been taken up in America.

DR. DURRANS said that lacquer manufacturers in this country had been flooded with literature concerning glycol ethers, but as yet they had not been very widely adopted here.

DR. DUNSTAN, replying to the discussion, said that the last thing he wished to do was to decry British chemists. All this work on pyrolysis was British, and what he wished to see was that it should be British-applied and not American-applied. Trustification as carried out in America might or might not be a good thing, but in the matter of research it had the important effect of pooling resources, and that was what he wished to see done in this country. As regards the I.G.'s output of synthetic gasolene, the latest figures he had indicated that the output last year was only 30,000 tons, although it was conceivable that the output would be 200,000 tons or more in a very short time as mentioned by Dr. Ormandy.

#### Dispute Over Secret Varnish Processes

BEFORE Mr. Justice Romer, in the Chancery Division last week, a claim to prove in the liquidation of the London Varnish and Enamel Co., Ltd., for a sum, said to be £5,300, for damages and commission, which had been made by Mr. Henry George Dew, the company's varnish maker, was heard on Mr. Dew's application to reverse the decision of the liquidator, who had rejected the claim.

It was stated for Mr. Dew that when the company's business was sold to Jensen and Nicholson, Ltd., his agreement with the liquidating company had some years to run. He was offered employment by the purchasing company on the same terms as before, but with an added stipulation that he should disclose his knowledge of certain secret processes he acquired, chiefly from his father, to his new employers. He refused to do this, and was, therefore, not employed. It was on this ground that he claimed damages against the liquidating company on the ground of breach of agreement.

For the liquidator it was submitted that the purchasing company were entitled to the information, which was necessary to enable them to execute repeat orders for varnish. Mr. Dew had refused this, allowing them access only to entries in his diary which, said counsel, were incorrect, and therefore useless.

His Lordship held that the claim to prove for damages failed, saying that the company had the right to dismiss Mr. Dew. He had admitted that he had made incorrect entries in his diary. His claim to commission had been admitted, and the costs would be apportioned accordingly.

#### Pine Institute of America Abstracts

THE Pine Institute of America, Inc., publishes monthly a list of abstracts of chemical interest. Each month about 170 domestic and foreign trade and technical publications are reviewed, and all articles and patents pertaining to turpentine, rosin, terpenes, resins, or industries consuming these products, are abstracted, and these abstracts published and issued monthly. It is not proposed to take the place of any of the existing abstract journals, but rather to collect in one monthly publication all data pertaining to this particular field. These abstracts are mailed to those who indicate an interest, without charge. The address of the Institute is: Barnett National Bank Building, Jacksonville, Florida, U.S.A.

# Low Temperature Carbonisation and Coal Liquefaction

## Dr. Lander's Third Cantor Lecture

*In his third Cantor Lecture on "The Treatment of Coal," delivered before the Royal Society of Arts in London, on Monday, Dr. Lander included considerations both of low temperature carbonisation and of those chemical processes which had for their object the conversion of a much greater proportion of the coal substance into liquid fuels than could be effected by any method of carbonisation.*

DR. LANDER said that in view of the large amount of discussion which had taken place on low temperature carbonisation, he felt it unnecessary to describe at this stage what low temperature carbonisation was, or to go closely into the benefits which it was claimed would result from a wide application of the system. It had been put forward from time to time by interested parties as a panacea for various ills in such exaggerated terms as had tended to discredit it. On the other hand, largely owing to the painstaking efforts of a certain group of investigators, working in harmony with each other, there had undoubtedly been a great access of knowledge, and although there did not lie behind low temperature methods the wealth of practical experience and information which backed up the successful commercial operations of high temperature carbonisation, it could at least be said that they were now fairly well understood, and at the present time in various quarters there was taking place a steady development of types of apparatus based on sound principles. The time was definitely past in which the enthusiasm of over-sanguine promoters could venture to make such claims as that low temperature carbonisation should be substituted entirely for high temperature gas works operations, or be applied generally as a preliminary process to all our coal.

### Low Temperature Carbonisation in Great Britain

In this country the claims made for low temperature carbonisation, which were quite justifiable, were twofold. Firstly, it could provide a source of domestic fuel for the open grate and so would tend to make the country much cleaner, since a very large proportion of our smoke nuisance came from these appliances; and, secondly, our geological formations were not able to provide directly any appreciable quantities of natural liquid fuel, and we therefore were forced to import from overseas a material which during the last twenty years had rendered itself vital to the continuance of the social conditions of the country in their present form. The quantities of oil and light motor spirits which were now used were so great as to render it extremely unlikely that the complete replacement of sea-borne oil by a home by-product obtained from a carbonisation process could ever take place, but anything that could be done in this direction would be of great national advantage.

As regards the question of national defence, the great growth in the estimated requirements for this purpose now rendered it absolutely impossible to satisfy them except to a very small degree by a mere by-product. If, on the other hand, a really large proportion of the coal substance could be directly converted into oil, this argument would not apply, and when discussing the developments in the hydrogenation of coal, or the synthetic production of motor spirit from water-gas, these arguments legitimately came into the picture.

### Work of the Fuel Research Board

The Fuel Research Board had put the question of low temperature carbonisation in the forefront of their programme some twelve years ago, and had worked steadily on with it ever since. Various methods had been tried, but it was soon decided to pursue the work along the lines of externally heated retorts.

The lecturer pointed out that at the present time it had not been definitely proved by anyone that commercial success had been obtained, and indeed that the time had been too short for such definite proofs to be forthcoming. The technical working of a plant was not the only factor which affected the commercial prospects, but they were also affected by local conditions and management. At present there were several large scale plants running, more were being erected, and reliable commercial data should be available very shortly even if we had not got it at present. The process was very definitely launched, and the different systems would now have to stand or fall according as they could or could not pay dividends from the results achieved in day-to-day working.

The Fuel Research Board, after working with several types of apparatus, had adopted one which was a modification of that used in the Scottish shale oil industry. The retorts were of cast iron, 6 ft. 3 in. by 7 in. at the top, tapering to 6 ft. 9 in. by 11 in. at the bottom, and 21 ft. high. A semi-intermittent method of working had been adopted by which it had been found possible to obtain good results over a wide range of coals. A semi-commercial battery of 40 of these retorts was now being heated up at the Richmond gas works of the Gas Light and Coke Co., and carbonising should commence in a few weeks' time. In conjunction with these a setting of Hird retorts was also to be tried.

Dr. Lander pointed out that the yield of tar obtained by low temperature carbonisation was of the order of 16-25 gallons per ton of coal; although higher figures might be obtained under exceptional circumstances it was not likely that this could be increased by more than, say, 30 to 40 per cent.

### Hydrogenation of Coal

The hydrogenation process had been shown by experiments both at the Fuel Research Station and elsewhere to be capable of producing from 110 to 130 gallons of distillable oil per ton of coal actually used in the process, although an additional quantity of coal might be required for power and hydrogen production. The process consisted in adding hydrogen to the coal substance under conditions of elevated temperatures and pressures. In this way a considerable portion of the coal substance was converted to a product which was liquid at ordinary temperatures.

A problem of considerable difficulty was that of introducing a solid material such as coal into a vessel containing hydrogen under a pressure of 200 atmospheres. Bergius had solved this by mixing ground coal with a liquid organic vehicle so as to form a paste which could be pumped by special appliances. To this mixture was added a small proportion of iron oxide to act either as a catalyst or as a means of removing sulphide of hydrogen in the gases evolved. In the continuous type of plant used at Mannheim and at the Fuel Research Station, three reaction vessels or bombs were used in series, the first being maintained at about 460° to 480° C. and the two final ones at about 490° C. The exact temperatures required in the final bombs were somewhat critical and depended on the type of coal used. The product leaving the last bomb was cooled and its pressure reduced in two stages, firstly to 60 atmospheres where the gas evolved was scrubbed with oil in order to extract motor spirit, and secondly to atmospheric pressure where the final crude product was collected.

### Products of Hydrogenation

The final crude product contained the whole of the inorganic matter of the coal, together with the added iron oxide and a certain amount of partially converted solid material. These solids had to be removed before distillation could be effected. A typical example of the yields per ton of coal in the continuous plant (one ton per day) at the Research Station was:—

YIELDS PER TON OF COAL.		
Hydrogen Consumed = 114 lb.		
Fraction .....	0°-175° C. =	83 lb.
" .....	175°-230° C. =	208 lb.
" .....	230°-270° C. =	197 lb.
" .....	270°-310° C. =	105 lb.
" .....	310°-360° C. =	208 lb.
Pitch .....		= 329 lb.
Gas benzine .....		= 42 lb.
Bergin gas .....		= 325 lb.
Unconverted coal .....		= 363 lb.
Water .....		= 179 lb.
Coal ash .....		= 161 lb.
Loss .....		= 154 lb.

2,354 lb.

It would appear that the chief value of the fractions from the hydrogenation of coal would be either as a motor spirit or as  
(Continued on page 121)

(Continued from page 120)

fuel oil, although there were indications that certain of the fractions might be of value as lubricating bases.

#### Action of the Hydrogen

The hydrogenation plant at the Fuel Research Station was also used to investigate the exact part played by the hydrogen in converting the coal into oil, and coal had been fractionally hydrogenated, the process being interrupted at a series of stages. It was found in experiments in which an extremely small amount of hydrogen had combined with the coal, that the first effect of this was to produce a product which was fluid at the temperature and pressure of the reaction, and which became solid on cooling. This product possessed caking properties much greater than that of the coal from which it was formed, and even when the coal used was non-caking, the product possessed very high caking properties. In general, the work showed that in the first instance the hydrogen appeared to eliminate oxygen from the coal substance. The phenomenon was being investigated from a number of angles, but it was not yet possible to explain fully the exact mechanics of the reactions. Although probably of great importance in the future, the process of hydrogenation, at any rate so far as the bituminous coals of this country were concerned, was not able to make oil as yet at a price anywhere near that of the cost of similar fuels obtained from natural sources.

#### Liquid Fuel from Water Gas

The lecturer finally discussed the type of process whereby it was claimed that large quantities of liquid fuel could be obtained by synthesis from water-gas, but pointed out that whilst high-priced products such as methyl alcohol were already being produced commercially by these methods, it did not appear to be possible, at any rate for the present, that such processes could be operated commercially for the making of liquid fuels in this country.

### Sulphur Compounds of Mineral Oils

Paper by Dr. Challenger

At a joint meeting of the Manchester and Liverpool Sections of the Society of Chemical Industry held at the Engineers' Club, Manchester, on Friday, February 1, Mr. C. J. T. Cronshaw presiding, a paper entitled "The Sulphur Compounds of Shale Oil and Petroleum" was read by Dr. F. Challenger.

Dr. Challenger gave a summary of the principal types of sulphur compounds which had been detected and isolated from mineral oils and the methods by which this isolation was effected. The work of Mabery, Thierry, Birch and Norris, Weissgerber, and Scheibler was considered. He then dealt with his own investigations of the sulphur compounds of Kimmeridge shale oil, whereby the presence of thiophen, mono- and di-methylthiophen, and ethylthiophen was detected in the oil. Other compounds isolated were tetrahydrothiophen and thionaphthen. These results were obtained three years ago, and further work had produced results which were to be published in the near future.

Reference was made to the potash fusion method for the rupture and consequent detection of thionaphthen derivatives, as worked out by Weissgerber, and to the sodium reduction method of Fricke and Spilker. These methods were valuable aids to research, potash fusion being possibly of technical importance.

Weissgerber had detected tetramethylthiophen in low temperature tar oil, and had dealkylated it in the presence of hydrogen at 650° C. in a tin-lined iron tube.

#### Unsolved Problems

Dr. Challenger then indicated some unsolved problems relating to the sulphur compounds in mineral oils. Probably not all the sulphur compounds found in petroleum distillates were originally present in the crude oil, though many must be so present. Some probably arose during distillation, from the action of free sulphur on the hydrocarbon ingredients of the crude oil. The free sulphur of crude oil probably arose from the atmospheric oxidation of dissolved hydrogen sulphide with which the oil was originally highly charged. There was no satisfactory evidence, however, that the sulphur compounds of the low-boiling distillates arose from the decomposition during distillation of some complex sulphur compound of the crude oil. Various statements in the literature would seem to lead

the reader to infer this, but they were apparently based upon insufficient evidence.

The lecturer then indicated the need for an investigation of the mode of combination of sulphur in the "kerogen" of the shale. The sulphur compounds in shale oil doubtless arose in part from this "organic sulphur," but possibly also in part from mineral sulphur such as pyrites and gypsum contained in the mineral matter of the shale. Attention was also drawn to the fact that practically nothing was known as to the nature of the sulphur compounds in mineral oils of boiling point higher than 250° C.

## The Future of Billingham

### The Importance of Shipping and Transport Facilities

"If the development of the north bank of the Tees chemical industry is to flourish as it should, there is one further thing necessary, and that is, that the railway, dock, river, and shipping authorities take a wider view than they have done hitherto, and combine to put us in as favourable a position as any competitor abroad." This was one of the outspoken comments of Colonel G. P. Pollitt, managing director of Synthetic Ammonia and Nitrates, Ltd., in an address at the monthly luncheon of the Middlesbrough Chamber of Commerce last week.

Colonel Pollitt not only described the romantic growth of the Billingham chemical works, but also intrigued his listeners by giving them a peep into the future. It was one of the largest gatherings of the Chamber.

Colonel Pollitt remarked that the essential qualities of a chemical works site, capable of really large scale development, were cheap coal and coke, ample boiler and cooling water, accessibility of essential raw materials, such as sulphur and salt, ample skilled labour, and first-rate shipping facilities. Billingham, he said, had all these, except, perhaps, the last. The only side of their development, which, in his opinion, had lagged behind was shipping and dock facilities. Since practically the whole of their manufacture went abroad and was sold in fiercely competitive foreign markets, they could not afford permanently to be handicapped in comparison with their continental competitors by our unduly high transport and shipping charges.

### Shipping Costs Too High

"At present," said Colonel Pollitt, "we are dependent on the Middlesbrough docks, and we believe, frankly, that our cost of shipping is too high and also that our full programme will cause serious congestion of the existing facilities. We hope that the authorities concerned will help us to the final result and a convenient dock on the north bank of the river to which the largest liners using the river will have access."

From their works to the docks as the crow flies was about one mile. Their goods had to travel eleven miles to arrive at the same place. The cost of this transport seemed to them to be excessive, and they were not convinced that the docks were even in a position to cope with their whole tonnage. "We believe," he said, "that our chief competitors, whose works are 400 miles from an export shipping port, can put their goods alongside ship at as low, or at a lower rate, than we can."

Colonel Pollitt pointed out that by the conclusion of their programme the firm would have spent a capital sum of well over twenty million pounds on the plant and buildings. Of this amount, at least 98 per cent. had been spent in this country, though some of the materials could have been obtained more cheaply abroad. To show the magnitude of their enterprise, Colonel Pollitt mentioned that at present, omitting salt and cement, they were producing at Billingham some 1,100 tons of material per day. By the end of 1929 the firm would have increased their capacity to two and a half times these quantities, and should have a daily output of nearly 2,500 tons, or over 800,000 tons per year. In addition, they should produce some 700,000 tons per year of carbonate of lime, a by-product of the process. To deal with this lime they had entered the cement industry by the acquisition and extension of Casebourne's factory. They were also making every effort to extend its use in agriculture, as the soils of this country, speaking generally, were in desperate need of lime. By the middle of next year the firm would have added several further important manufactures to its list.

## The Control of Science

(From a Correspondent)

*The following article deals with the subject of the position of the chemist in industry, and especially with his responsibilities and the status necessary for their proper discharge.*

SIR WILLIAM BRAGG's observations in his presidential address to the British Association at Glasgow on the peculiar if not privileged position of the scientific worker in industry are particularly worthy of note in view of experience of the Whitley Councils Scheme. The fundamental idea behind the Whitley Councils Scheme is sound, and if the form in which it has first found expression has for any reason proved really impracticable, it should not be impossible to find others by which the desired tripartite harmony may be achieved.

### Position of the Industrial Chemist

The industrial chemist is undoubtedly in a position to appreciate both the point of view of the employer and of the ordinary employee. In many cases his responsibilities force on him an appreciation of the employer's difficulties and problems; to his subordinate workers, if not *de jure*, he may be *de facto* the employer. At the same time, in his personal standing of employee, he shares the anxieties and aspirations of those under him. From his understanding of purposes and methods, the industrial chemist often has unrivalled opportunities of imparting to other workers the enthusiasm and loyalty which are no small factors in the success of an industrial undertaking.

Moreover, he is in a position to represent impartially and forcefully to the employer difficulties or dangers arising in the occupation and often important causes of unrest or anxiety among the workers generally. It is true that, especially in smaller firms, the chemist is sometimes treated entirely as an employee, and does not receive the recognition or standing to which his professional training entitles him. This, however, is a mistaken policy, and one by which the employer is the first to lose. Sir William Bragg has struck the right note in reminding scientific workers of their special responsibilities in industry, and both scientific workers and the leaders of industry should heed these responsibilities—the one to confer status where it is withheld, the other to use that status to promote industrial peace and efficiency.

### Science and Industry

That the expansion of industry to-day is inextricably interlocked with science is a commonplace, and the *Manchester Guardian*, in commenting on Sir William Bragg's address, rightly says that the time is now past for mere commendation of the achievements of science. It is not sufficiently realised, however, that the national interest demands imperatively that scientific workers in industry receive due status. Without it they are unable to discharge the larger functions which scientific developments in industry increasingly thrust upon them.

The community has a right to expect that the scientific resource and invention which brings industries into being shall be able, from the start, to prevent the growth of unhealthy conditions of work or the creation of nuisances. It is in the public interest that the scientific worker in responsible control shall have not only the ability to foresee and avoid such contingencies but the standing which will enable him to resist pressure from economic causes tending to make him relax precautions which he would otherwise desire. The existence of a tripartite scheme in such industries should be particularly valuable in promoting co-operation and confidence on the part of all concerned.

### Foresight

The rapid changes in industry, and indeed in our daily life, proceeding under the inspiration of science, are producing a host of problems, the solution of which is essentially the responsibility of the scientific worker. It is not enough for him to apply the discoveries of science to industrial purposes. He must show the way to control those very powers which he has himself released. The problems of aviation control, whether in peace or in war, have arisen from the results of research work in aeronautics. The introduction of oil-fuel for liners, etc., has created a problem of disposal of waste fuel, and already the short-sighted policy of dumping it at sea has had serious results at many places on our coast line. The

prevention of river-pollution, the problem of smoke abatement or prevention—these are both problems which are intensified by the expansion of industry under the guidance of science.

It is never easy to envisage the full consequences of a scientific discovery, but it is an imperative need of to-day that scientific workers should attempt to foresee such consequences, and to suggest means of dealing with them at the earliest and easiest moment. Much useless expenditure of public money, and many unsatisfactory and makeshift arrangements, might easily have been avoided in the past had scientists of sufficient foresight and character taken their part in local and national administration.

Scientific workers in general must accept these newer and wider responsibilities, and a large share of responsibility falls on the shoulders of chemists in particular. Such responsibility, it is true, can only be discharged effectively if scientific workers receive proper recognition and status in industry. The passage through Parliament of the recent Food and Drugs (Adulteration) Act in face of the representations of the Society of Public Analysts and of the Institute of Chemistry, is evidence enough that recognition of the chemist has not yet reached its highest point.

### The Question of Registration

It is in the belief that the registration of chemists will tend to raise their status that the British Association of Chemists has pressed forward the question of registration. There are admittedly difficulties, especially in industry, but they are not insuperable. On the other hand, it is much more difficult to see how the status to meet their responsibilities can be conferred on chemists, among other scientific workers, unless the nation, and industry in particular, has adequate assurance of their competence. The British Association of Chemists proposes to create a register on which would be found the names of those chemists who, in the opinion of the recognised professional authorities, possessed a standard of competence that would justify public confidence in them. The existence of such a register would tend to ensure that the direction and control of chemical operations were in competent hands.

Admittedly this would not be enough. In the national interest the chemical control of industry must be thoroughly competent, and competent chemists must be available to handle the wider problems involving a knowledge of chemistry, to which allusion has been made. Chemists must be mindful of the problems which their work itself creates, and must endeavour to exercise a foresight which will provide a wise solution to such problems before the public good is threatened or disturbed. They must take their place in the full stream of national life and government, endeavouring to bring into municipal and national politics a scientific spirit which will promote the rational handling of such affairs, and render increasingly difficult the surrender of national interests to petty prejudices. It is not in the laboratory or the works alone that the chemist must demonstrate that the mission of science is to serve.

### British Association of Chemists

THE London section held a smoking concert at the Broad Street Station Grill Room on Friday, February 1. The committee are to be congratulated on another successful evening, and the support of the increasing attendance of members and friends at these enjoyable functions is a satisfactory indication that the arrangements are appreciated. The performers were all either members of the London Section or their friends. They included Mrs. Cosbie, Mrs. Rhodes, Miss Lloyd-Wiley, Messrs. Price, Rhodes, Redgrove, Fleet and L. Fleck. Professor G. T. Morgan (who was accompanied by Mrs. Morgan) presided, and the proceedings terminated with a hearty vote of thanks to the chairman. Members are reminded that the annual dinner of the London Section will be held on Saturday, February 23. Tickets, 8s. 6d. each, may be obtained at the Head Office, "Empire House," 175, Piccadilly, London, W.1.

## Chemical Trade in Manchester

### Chamber of Commerce Report

THE last number of the *Journal* of the Manchester Chamber of Commerce contains an interesting report from the chemical and allied trades' section of the Chamber, dealing with the year 1928.

"The multiplicity of interests (it is stated) covered by the chemical industry and its allied trades are so varied and extensive, that, in an annual summary, it is impossible to do more than indicate in a very general way the main factors which have governed the industry and their effect upon it. Broadly, however, such a summary will be concerned with the interests of manufacturers and users of chemicals and those also of the distributing merchants, and in all of these there is strong evidence of a continued process of change and development.

"Throughout the year the manufacturers have continued their efforts to consolidate their position in order to remove, as far as possible, what they had come to recognise as uncontrolled competition. Association of various interests still continue, and the effect of this has been felt in varying degree both by users and merchants and has somewhat added to the difficulties in the general conditions of trading. Particularly is this the case with the merchanting interests, who carry on their business with some feeling of insecurity in the present and of uncertainty as to the future.

### A Steady Year

"The year has been one of steady trading with no special features of outstanding importance either in the way of fluctuating markets or, happily, of trade disputes. In the volume of general trading, there is still room for considerable improvement, even though the exports of manufactured chemicals, drugs, dyes, etc., for the eleven months ending November, 1928, are valued at over 23 millions, which is an increase of about 8 per cent. over the like period of the previous year. The development of new industries, such as artificial silks, lacquers and solvents, the production of fertilisers from atmospheric nitrogen, certain fine chemicals, drugs, dyes, food accessories, etc., has had a noticeable effect on the nature of this increase, and is in no small measure responsible for its amount. Correspondingly a like effect is observable in the character and amount of the chemical products consumed within the country. Prices all round have been maintained at a steady level, but at the close of the year there are some important changes to record. Reductions in the prices of certain alkali products, both for spot supplies and contracts, have been notified and will be welcomed by such large users as the artificial silk and mercerising interests. There has also been an increase in price and important change in the conditions of sale of bichromates of soda and potash, this being the outcome of an arrangement between British, America and Continental manufacturers. Borax and boracic acid prices remain steady but uncertain as to the future, and the same may be said with regard to the oxides of lead, regarding which it is well known that efforts towards the formation of a European convention are being made.

"As has been already said, the tendency towards combination, co-operation and absorption, still continues, but, in spite of the unsettlement which surrounds such happenings, we look forward to the coming year full of a certain warranted hope that a still further improvement in trade will be well on its way before many months have passed.

### Safeguarding of Industries Act

"In the last annual report it was mentioned that attention had been directed to the terms of the Safeguarding of Industries Act. During the past year these have again been under examination. As is known, the Act provides for a year-to-year list of safeguarded commodities, and articles scheduled therein are subject to a standard import duty of 33½ per cent. The state of uncertainty which exists towards the end of each year as to whether duties scheduled under the Act will be withdrawn or reimposed has long been held to interfere with the free flow of business.

"Your committee, after carefully considering what steps could be taken to overcome the difficulties encountered under the present system, finally adopted the following resolution:— 'That representations be made to the Board of Trade respecting the inconvenience caused to importers and users of materials

removed from the schedule of articles liable to duty under the Act, because of the uncertainty arising from this exclusion being for a limited period only; and further, that it be urged upon the Board that at least two months' notice should be given of any change in the list of scheduled articles in order that importers and users may make arrangements in advance to meet trade needs without incurring the risk of having to pay duty when the goods are imported, although such a duty did not apply when the goods were purchased.'

"This was presented to the board of directors, and eventually transmitted to the President of the Board of Trade.

### Standardisation of Contracts

"The standardisation of contracts has been much discussed by your committee during the year. The trade advantages to be derived by the adoption of a form of contract acceptable to buyer, seller and consumer are well-known. Much time and careful consideration will, however, be necessary in the very difficult work of evolving such a document.

"The Farinaceous Products sub-committee has been active in an endeavour to overcome a difficulty experienced by the trade through loss of weight during transit on shipments of sago flour from Sarawak via Singapore. This loss is attributable to excessive moisture. The circumstances attending shipment have been thoroughly investigated, whilst individual members of the sub-committee have conducted laboratory experiments. Contact with the Sarawak Government representative in London has also been established. It is believed that these investigations have led to a solution of the problem which has been exercising the minds of those concerned for several years...."

## Minor Constituents of Glass

### Paper by Professor W. E. S. Turner

At a recent meeting of the Birmingham and Midland Section of the Society of Chemical Industry, Mr. W. A. S. Calder (chairman) presiding, Professor W. E. S. Turner delivered an address on "Some Important Minor Constituents in Glass."

Professor Turner concentrated on three subjects—moisture, arsenous oxide, and iron oxide. Moisture was as a rule present in the glass-making mixture by accident; that was to say, particularly, in the sand which had not been dried. Some experiments carried out at Sheffield had shown that glasses melted from mixtures containing a substantial amount of moisture differed in their ease of manipulation with increasing moisture content. For example, the glass set rather more rapidly. The theory was that moisture was retained in the glass even after it had been maintained for a considerable period at 1,400° C. Recent work by Salmang and Becker had brought confirmation of this. It was astonishing to find so volatile a substance as water retained so tenaciously. Arsenous oxide was also a volatile substance, yet experiments had demonstrated that most of this which was present in the glass-making mixture was retained in the glass. Another extraordinary feature was that a considerable proportion of it was converted to the higher oxide.

### Iron Oxide

An account was also given by Professor Turner of the respective behaviour of ferrous oxide and ferric oxide in small amounts in glass. The control of these constituents was important from the point of view of the manufacture of glass transmitting ultra-violet light. In this glass the iron oxide content should be kept below 0.03 per cent.; and it was the rule to melt glass under such conditions that as high a proportion of this as possible was obtained in the ferrous form.

Professor Turner mentioned that iron oxide might be very useful when it was necessary to produce colour. The shades of colour varied considerably. He exhibited a number of pieces of glass containing oxides of iron, the oxides ranging from 3 to 26 per cent., with the colours varying from a dark green, through olive green, up to something practically opaque. In the ferrous oxide examples the colour was, he said, always a blue green; while the ferric oxide samples were of a yellowish green. The colouring power of ferrous oxide was the greater. The point of balance between ferric and ferrous oxide played a distinct part in the success of making vitreous and similar glass for transmitting the rays of sunlight.

### I.C.I. Works Council Scheme

#### Important Feature of Labour Policy Inaugurated

THE February issue of the *I.C.I. Magazine* contains an important announcement with regard to the inauguration of the company's works council scheme. The scheme is based on the works council at each factory. From the works council will be elected representatives to a group council, which will represent all factories making similar products. Each group council will send representatives to the central council in London, presided over by Lord Melchett. All the councils will consist of equal numbers of management and of the workers' representatives, and every effort has been made to ensure that the workers at each factory are adequately represented.

Care has also been taken to make sure that the foundation of the whole scheme—the works council—is properly elected. Every worker will have the right to nominate candidates, and the ballot will be conducted exactly like a Parliamentary election.

#### Trade Union Co-operation Invited

All recognised trade unions will be invited to co-operate in the formation of the works councils. They will be invited to nominate candidates in exactly the same way as the workers themselves, and, for the sake of clearness, the unions' nominees will be "starred" on the ballot paper. All the nominations, whether made by the unions or by the workers direct, will be put to the poll, and every worker, with a minimum of twelve months' service, may vote.

No one but an employee with five or more years' service can be elected to the council, but the council is given power to invite anyone it likes (for example, a trades union official) to attend any meeting in a consultative capacity. The councils are not intended, however, to deal with matters which are the subject of trades union agreements, save in exceptional circumstances, which are provided for in the rules.

The main purposes of the whole scheme are described as follows in the rule-book, a copy of which will be supplied to every worker: (a) To give the employees a wider interest in, and a greater responsibility for, the conditions under which their work is performed; (b) to provide a recognised and direct channel of communication between the employees and the management on all matters directly affecting their joint or several interests; and (c) to promote throughout every factory a spirit of co-operation in securing the efficiency of that factory and the contentment of the employees.

#### The Savings Bank Scheme

A further development of interest is the general introduction in all I.C.I. works of a savings bank scheme, which has been in existence in some I.C.I. works for many years. Deposits may be made with the cashier of the employing firm, with (1) cash, which may be deposited at any time except on pay day; (2) deductions from pay; and (3) dividend warrants for I.C.I. shares and Government stocks. On each complete £1 deposited, interest at 5 per cent. per annum is added every half-year, on June 30 and December 31.

Safety campaigns are to be inaugurated shortly by the managements of all I.C.I. factories in co-operation with their works councils. Awards of £2 (up to a total of five) are being made monthly for the best suggestions made by operative workers in the I.C.I. factories for incorporation in accident prevention posters.

### The Holborn Explosion Inquiry

DURING the past week the commission of inquiry into the Holborn explosions continued its sittings. On Thursday, January 31, Mr. Harold Moore, giving evidence, said that of the three theories advanced as to the cause of the explosions he preferred that of coal gas. Dr. H. Coward expressed the opinion that coal gas was present in the Post Office tube. On Friday, February 1, evidence was given by Dr. E. Arden, consultant to the Manchester Rivers Committee, who was called by the Attorney-General on behalf of the Post Office. He said that he had so far found no evidence that the explosion was caused by anaerobic fermentation.

It was agreed between the commissioners and counsel for both parties that a series of six or more borings should be taken out at intervals along the route of the tube with the object of seeing whether anaerobic fermentation was taking place.

### Preparing Against Chemical Warfare

#### Protection of the Civilian Population

DR. F. R. HUMPHREYS, late major attached to the Royal Army Medical Corps (T.), speaking on Friday, February 1, on "The Civilian Population and Chemical Warfare," recalled to members of the Royal Sanitary Institute the first gas attack at Ypres in 1915, when 5,000 men were killed and an enormous number of men were injured in a few minutes. That, he said, was a clear indication as to what would happen to our undefended civilians. To meet a sudden and unpreventable gas attack he suggested that an organisation divided into four sections was necessary. The first section would have the duty of getting gas-proof rooms—like those prepared for disinfection after an infectious disease—in each house for incarceration of the inhabitants, while the second section was clearing the roads by flushing down and the use of appropriate chemicals.

The third section would be necessary for decontaminating the clothing and persons of those who were endangering others and themselves by gas carried on their persons and clothing, a very dangerous matter. The fourth section would consist of the voluntary aid societies under the local medical practitioners, giving first-aid and providing for removals to hospital. Wholesale removals would be necessary in the more dangerous areas, with provision of billets and necessities temporarily. Protection in the field was afforded by masks and dug-outs, but these were not available in our huge crowded towns. Protection must be afforded, if we were not to lose our place in Europe and endanger both our existence and our influence in Europe's peace councils.

The Earl of Halsbury, who presided, said the problem which had to be faced in the future was not what might happen to trained troops with gas masks, but to an untrained civilian population without gas masks. It was for the civilian populations of the world to get together and declare that they were not going to have their womenfolk and children obliterated.

#### Chemical Merchants' Affairs

DAVID MISELL and Julien Misell (trading as D. and J. Misell), chemical merchants, of 10, Rangoon Street, Crutched Friars, London, attended before Mr. Registrar Francke in the London Bankruptcy Court on Friday of last week for their public examination. According to their statement of affairs, their joint liabilities amounted to £2,121, of which £2,041 are returned as expected to rank, and their assets are valued at a net amount of £1,266. On examination by the Official Receiver, the debtor, David Misell, said that it was a fact that he had previously failed in November, 1900, when after having carried on business as an agent and dealer in aniline colours, he was adjudged bankrupt with liabilities amounting to £1,935. His assets, which were valued at £279, realised £145; a dividend of 9½d. in the £ was paid and he obtained his discharge in June, 1901, subject to a suspension of three years from January 18, 1901. After 1907, he was employed by a firm of chemical merchants, and in 1913 he and another person began business in partnership as chemical merchants under the style of R. Lane Hall and Co., at 4, Lloyd's Avenue. In March, 1917, a limited company with a nominal capital of £5,000 in shares of £1 each was formed with the object of among other things acquiring the business as a going concern. In satisfaction of his interest he was allowed 1,001 shares in the company, and he was appointed managing director, but the company was not a success, and in September 1920 it went into voluntary liquidation. He was afterwards again employed by various firms of chemical merchants. In April, 1926, with an overdraft up to £400 guaranteed at the bank by his wife, he recommenced business in partnership with his son Julien as chemical merchants, and they traded together under the style of D. J. Misell in Cooper's Row. In May, 1927, the firm removed to 10, Rangoon Street, but its business had been adversely affected by the lack of enough capital, and the trading for the first year resulted in a net loss of £233. Afterwards they traded at a loss. Last September, following on pressure by creditors, they executed a deed of assignment. The failure of the firm had been caused by lack of enough working capital and by the gross profits having been insufficient to meet heavy overhead charges such as rent. The examination was concluded.

## Chemical Matters in Parliament

### Radium

In reply to Mr. R. Morison (House of Commons, January 28), Sir Kingsley Wood said that the Minister of Health could not say when the report on radium by the sub-committee of the Committee on Civil Research would be received.

### Coke Oven Plants

Lord H. Cavendish-Bentinck (House of Commons, January 30), asked the Prime Minister whether the Government would consider what assistance and encouragement it could give towards creating an amalgamation of the coking interests in Durham and Northumberland, in order that the present numbers of coking plants might be largely reduced and inefficient plants replaced? The Prime Minister answered that the National Fuel and Power Committee in their Report issued in September last recommended that the coke oven owners should in many cases consider plans for reorganising their coke oven plants into installations serving a number of collieries and equipped with a modern type of oven. That recommendation had been communicated to the National Association of Coke and By-Product Plant Owners for such action as they might think expedient.

In answer to other questions, the Prime Minister said that a good many schemes were at present under consideration.

### Oil from Coal

Mr. Batey (House of Commons, January 31) asked the Secretary for Mines whether it was the intention of the Government to assist in starting any by-product works in the county of Durham whereby oil and other commodities might be extracted from coal under the low-carbonisation system, and thereby find work for unemployed miners? Commodore King replied that he had no new measures to announce.

In reply to Mr. Rennie Smith, who asked whether the I.G. had not overcome the initial difficulties of coal liquefaction, Commodore King said that he was advised that from information derived from experiments at the Government Fuel Research Station and elsewhere, the initial technical difficulties in the liquefaction of coal had apparently been overcome. There remained, however, the serious difficulty of making the process commercially feasible. This had not been achieved either in this country or elsewhere, at any rate as regards bituminous coals.

### Uranium Ores in Australia

Mr. Amery informed Sir R. Thomas (House of Commons, February 4), that he had no information as to the existence of promising deposits of uranium ores in Australia.

### Artificial Silk Industry

Mr. Kelly (House of Commons, February 4) asked the Home Secretary what decision he had arrived at in the matter of placing under the Workmen's Compensation Act, certain operations in the artificial silk industry as coming under the industrial diseases section? Sir W. Joynson-Hicks referred to his reply to the question asked by Mr. Kelly in May last, and to correspondence with him in September. No fresh facts had since been brought to his notice which would lead him to modify the views then expressed. The only two specific ailments which had so far been brought to his notice in connection with the artificial silk industry were conjunctivitis of the eyes and sores on the hands which were sometimes caused by the acid. As regards the conjunctivitis, there did not appear to be any sufficient grounds for scheduling that disease. Even the severer cases did not as a rule disable the workman for more than one or two days, and in exceptional cases it had caused more prolonged disablement, it had been due to actual splashes of the acid into the eye which would constitute an accident within the meaning of the Act. The sores on the hands would appear to be covered by the diseases already scheduled under the Act.

Replying to Mr. Kelly on February 5, Sir W. Joynson-Hicks said that no figures were available with regard to the number of cases of injury to workers in artificial silk factories in 1928, and to the number of cases of injury to eyes.

### Sugar Content of Beet

Mr. Guinness, replying to Sir John Power (House of Commons, February 4), stated that the provisional average sugar content of the sugar beet crop for the 1928 season was 17.32 per

cent., as compared with 16.12 and 17.31 in 1927 and 1926 respectively.

### Dead Sea Salts Concession

Mr. Amery (House of Commons, February 4) informed Colonel Howard-Bury that Mr. Novomeysky made his first formal application for a concession to work the Dead Sea salts to that High Commissioner in July, 1921. In answer to further questions he said that the group to which the concession had been granted was headed by Major Tulloch (a British subject) and Mr. Novomeysky (a Palestinian subject). Colonel Howard-Bury asked whether Major Tulloch had not signed a power of attorney to Mr. Novomeysky, and handed over complete control of the concession? Mr. Amery replied that he had not heard of that.

### Ex-Enemy Property

Mr. Wellock (House of Commons, February 5) asked the President of the Board of Trade if he would state the total sum that had been paid or awarded to German nationals as compensation for dyeing and chemical interests held by them in this country at the outbreak of the Great War; whether any part of this sum had been paid or was to be paid by the Exchequer; and, if so, how much? Sir P. Cunliffe-Lister replied that the question of the compensation awarded or paid by the German Government to German nationals was one for the German Government, and His Majesty's Government had no information on the matter. The amounts realised from the sale of all property, rights and interests in this country of German nationals were credited to Germany in accordance with the provisions of the Treaty of Versailles, but no cash payment was made by the Exchequer.

### Research on Fish and Fish By-Products

Mr. Guinness (House of Commons, February 5) informed Sir A. Sinclair that with assistance from the Empire Marketing Fund, the Department of Scientific and Industrial Research had secured the lease of a site at Aberdeen suitable for a fish research station. Two buildings already in existence on the site were being adapted by His Majesty's Office of Works for use as laboratories for research on the preservation of fish and of fish by-products until experience had shown the requirements of a permanent building. Plans for the necessary cold store and other adjuncts were being made in consultation with His Majesty's Office of Works and with due regard to later developments.

### Progress of North British Artificial Silk, Ltd.

THE directors of North British Artificial Silk, Ltd., have issued a progress report to the shareholders. The report states that the work of construction at Jedburgh has continued along the lines explained in the chairman's speech at the statutory meeting on June 15, 1928. The original site has been greatly improved by the acquisition of adjoining properties. Where it has been found practicable, the existing buildings have been converted for the purposes of the preliminary chemical processes and, in addition, a large two-storey spinning and maturing building has been erected, together with other new buildings for subsidiary processes. A pipe-line brings the water supply from a dam in the river Jed 400 yards above the works, thus ensuring the original purity of the water, which is of admirable quality. The plant for the manufacturing processes is being delivered in weekly instalments, and now that the main buildings are practically clear of builders' men, the erection of plant, which has been proceeding since August, will be completed at a rapid rate. Arrangements have been made with the Jedburgh Town Council for a joint scheme for erection of seventy-six new houses on an excellent site on the main road, one-quarter of a mile from the works, and bungalows will also be built on another site facing the public park. Batches of workers have been receiving training at the experimental plant of Dobson and Barlow, Ltd., at Bolton. In a complicated process like artificial silk manufacture with, say, twenty-four sections or departments along the chain of operations, each one dependent on the other, it is not easy to calculate the exact date when production will commence, and the board are much more concerned with getting the installation work done thoroughly well in the first instance than in any attempt to create records by rushing through a complicated works for some premature date, only to have difficulties in adjustments afterwards. They have every reason to expect that production will commence in April, 1929.

## From Week to Week

MR. E. R. TAYLOR, A.R.S.M., F.I.C., has been appointed lecturer in metallurgy at the Central Technical College, Birmingham.

SIR HARRY MCGOWAN sailed in the *Mauretania* on Wednesday for America and Canada, and will be away from London for about six weeks.

A FUNERAL SERVICE for the late Mr. Rudolph Muspratt, son of Sir Max and Lady Muspratt, was held at Liverpool Cathedral on Thursday, January 31.

MR. M. LITTLEJOHN, hitherto on the staff of the Avon India Rubber Co., Melksham, has been appointed chemist to the I. T. S. Rubber Co., Ltd., Petersfield, Hampshire.

Mr. W. H. Portas, for many years plant and equipment engineer for Fuller Lehigh and B. P. Sexton and Co., has taken charge of the Brand Powdered Fuel Co.'s metallurgical furnace, cement, and kiln department.

MR. J. G. ASHWELL GRIFFITHS, B.A., of Emmanuel College, Cambridge, has been awarded a prize of £30 from the Gordon Wigan income for Physics and Chemistry, for an investigation on the photochemical decomposition of glyoxal.

"SOME TOXICOLOGICAL CASES" was the title of a lecture which Mr. Edward Russell (chairman) delivered at the last meeting of the Bristol and South Western Section of the Institute of Chemistry, describing examples met with in his experience as a public analyst.

DR. OLIVER KAMM, director of chemical research for Parke, Davis and Co., Detroit, U.S.A., has received a \$1,000 prize from the American Association for the Advancement of Science for his work on the ductless glands, and particularly his isolation of hormones.

THE STANDING JOINT COMMITTEE FOR RESEARCH at the University of Birmingham report the receipt from the Arley Colliery Co. of £100 towards the Fuel Treatment Laboratory; and from Imperial Chemical Industries, two donations of £300 and £450, towards researches in the Chemistry Department.

THE FORMATION of a new French combine for the manufacture of artificial silk from acetate is reported from Paris. The capital, stated to amount to 6,000,000 frs. will be held by Rhodiaseta to the extent of 50 per cent., Chemical Textile Co. (Kuhlmann group) 30 per cent., and Saint-Gobain, 20 per cent.

THE REPORT of the South Metropolitan Gas Co., just issued, makes a reference to the work which the company is carrying out on two low temperature distillation processes. Plant for the production of Coalite by the Low Temperature Carbonisation method will be installed at West Greenwich, while another low-temperature plant is being erected at East Greenwich by Coal Oil Extraction.

ARRANGEMENTS for celebrating in September of 1931 the centenary of Michael Faraday's discoveries in electro-magnetic induction were made at a meeting of British scientists, held on Tuesday, at the Royal Institution, in the hall in which Faraday announced his discovery to the Royal Society. Those taking part included Sir William Bragg, Sir Ernest Rutherford, Sir William Pope, and Dr. E. F. Armstrong.

AMONG RECENT CHANGES in the staff of Imperial Chemical Industries, Mr. W. W. Lumsden, F.I.C. has been appointed works manager at Nobel's Ardeer factory, on the retirement of Mr. J. A. Cockburn, F.I.C. Dr. J. W. McDavid has been appointed assistant works manager. Dr. D. G. Hopkins, of the research staff at Ardeer, has been appointed works manager of the Slough factory of Nobel Chemical Finishes and Naylor Bros.

FURTHER EXTENSIONS in connection with the great chemical plant at Billingham-on-Tees are indicated by proposals for new works and a wet dock to be constructed by Synthetic Ammonia and Nitrates, Ltd., on the north side of the River Tees, which were laid before the Tees Conservancy Commissioners this week. No details of the new developments have yet been made public, but it is understood that the company are negotiating for the lease of a large area of land.

A JOINT AUSTRALIAN ENTERPRISE between the du Pont organisation of America and Imperial Chemical Industries is announced. This is the erection of a joint factory at Deer Park, near Melbourne, for the production of artificial leather products. Nitrocellulose lacquers and similar products are also to be produced in Australia jointly by these concerns, with the co-operation of the Australian interests of the Associated British Lead Manufacturers, Ltd., at Sydney. It is reported that five million sterling is to be expended by I.C.I. in Australia.

MAJOR-GENERAL SIR NEIL-MALCOLM, K.C.B., and Sir Samuel Instone, directors respectively of the British Benzole and Coal Distillation Co., Ltd., and of the Bedwas Navigation Colliery Co., Ltd., last week visited Bedwas, Glamorganshire, and laid the first bricks of the new coke oven and by-product plant to be erected there. The plant is the first of its kind to be erected in South Wales and will, when completed, consist of 35 high temperature coke ovens with a rectification plant. The plant will deal with 750 tons of coal a day and will provide work for 2,400 miners in addition to the men actually engaged on the plant.

DR. BISH, of Bristol University, has been appointed Lecturer in Chemistry and Biology at the Leicester College of Technology.

THE OPIUM COMMISSION AT GENEVA has rejected by seven votes to four the American project for the State control of the manufacture and sale of narcotics.

A FALL OF CHEMICAL MANURES at the works of Richardson's Chemical Manure Co., Belfast, resulted in injuries to two workmen, Robert Hanvey and John McCooley.

UNIVERSITY NEWS.—London: The D.Sc. degree in chemistry has been conferred on Mr. E. Stedman, for a thesis entitled "The Relationship between Chemical Constitution and Physiological Action."

ARRANGEMENTS HAVE BEEN MADE for the shareholders of Waste Food Products to visit the works at Stanwell on February 14, to see the first unit of the plant in operation. The second unit is reported to be nearing completion.

NEW COKE OVENS and by-product plant are being established at Wintlaton Mill, Derwentside, by the Consett Iron Co., to supplement their existing works at Consett, Templetown, and Langley Park. About 1,700 tons of coal will be treated daily.

A SUM OF £20,000 is to be expended on the conversion of a former jam works at Wigton, Cumberland, into an artificial silk works for the British Netherlands Artificial Silk Co., which has been formed with a capital of £855,000. The contractors are Caton and Duckworth, of Blackburn.

UNDER THE NEW INDUSTRIAL AGREEMENT in the German potash industry the working hours underground will be eight hours a shift and above ground eight hours and a half. Wages will be increased by 8 per cent. The new terms will come into operation on April 15 and remain in force until November 30, 1930.

PROFESSOR F. C. WHITMORE, head of the department of chemistry at the Northwestern University, has been appointed dean of the school of chemistry and physics at the Pennsylvania State College. He succeeds Dr. G. L. Wendt, who has been appointed assistant to the president of the college in charge of research.

THE suggested Bill to relieve gas undertakings of certain legal handicaps and to enlarge their freedom in the management of their affairs is reported to be in process of being drafted at the Board of Trade, and the Government, in the event of the measure being regarded as non-controversial, are understood to be favourable to its passage during this Parliament.

THE CHEMICAL CATALOG CO., INC., has appointed Mr. H. Burton Lowe a vice-president. Mr. Lowe has been connected with the Chemical Catalog Co. for some years as district manager at New York. Prior to joining the staff of the Chemical Catalog Co., he was connected with the Chemical Industries Exposition. Over the period of the past ten years he has been active in various capacities in the chemical industry of the United States.

IT IS officially announced that in the International Nickel Co.'s section of the Frood Mine, 140 ft. of ore has now been crosscut at the 2,800 ft. level. At the 1,600 ft. drive, 50 ft. of ore has been cut, then 40 ft. of rock, and the drive is again in ore. The ore at the 2,800 ft. level averages 22½ per cent. copper-nickel, corresponding with the value of the ore cut at the 3,100 ft. level in the Mond section of the Frood Mine.

PRODUCTION OF CLOVES, the staple industry of Zanzibar, is threatened by the introduction of a synthetic product. Reference to this matter was made by Earl Buxton at a luncheon in London on Wednesday in honour of Sir Claude Hollis, British Resident in Zanzibar. Zanzibar produces 88 per cent. of the world's supply of cloves, and the rationalisation of the industry has been suggested in order to meet the possible competition of a synthetic rival.

THE DOMINION BUREAU OF STATISTICS at OTTAWA has recently published finally revised figures on the production of phosphate in Canada. Production in 1927 amounted to 151 tons with a valuation of \$1,717; in the previous year 40 tons worth \$800 were shipped. The 1927 shipments consisted of 113 tons of crude phosphate obtained from old mine dumps in the Provinces of Ontario and Quebec, and 38 tons extracted for experimental purposes in British Columbia. Imports of phosphate totalled 17,485 tons valued at \$94,758, consisting of 56 tons from Great Britain and 17,429 tons from the United States.

### Obituary

MR. GEORGE FREDERICK KENDALL, 45 years of age, of Little Garth, Glyn Cory, near Cardiff, for many years manager of the Anchor Fuel Works, Maindy, Cardiff.

MR. SAMUEL MILLER, in New York, at the age of 60 years, consulting engineer to the Union Carbide and Carbon Research Laboratories, and widely known as an authority on welding.

MR. DAVID W. WARREN, at Glasgow, at the age of 62 years, chairman and managing director of Hunter and Warren, Ltd., agents in Scotland for the Nobel Explosives Co. Mr. Warren had been associated with the explosives industry for over 40 years, and his standing in it was recognised in 1926, when, during the coal stoppage of that year, he was appointed emergency commissioner for explosives for Scotland.

## References to Current Literature

## British

ANALYSIS.—The iodometric estimation of iron. E. C. Grey, *J. Chem. Soc.*, January, pp. 35-39.

GENERAL.—Carbon sulphidoselenide. H. V. A. Briscoe, J. B. Peel, and P. L. Robinson. *J. Chem. Soc.*, January, pp. 56-60.

The diurnal variation of the gaseous constituents of river waters.—IV. R. W. Butcher, F. T. K. Pentelow and J. W. A. Woodley. *Biochem. J.*, Vol. XXII, No. 6, pp. 1478-1489.

The fluorescence of some vitamin A-containing fats. R. S. Morgan and K. MacLennan. *Biochem. J.*, Vol. XXII, No. 6, pp. 1514-1522. When a beam of light from a quartz mercury vapour lamp (from which nearly all the visible spectrum has been cut out) is allowed to fall on objects, a characteristic fluorescence is usually observed. Butter (which shows a yellow colour) may thus be distinguished from margarine (which gives a blue).

HISTORICAL.—The centenary of Wöhlers synthesis of urea (1828-1928). F. G. Hopkins. *Biochem. J.*, Vol. XXII, No. 6, pp. 1341-1348.

ORGANIC.—The alkaloids of some Indian aconites. II.—Pseudoaconitine. T. M. Sharp. *J. Chem. Soc.*, December, 1928, pp. 3094-3106.

The condensation of dichloroacetaldehyde with phenols. F. D. Chattaway and A. A. Morris. *J. Chem. Soc.*, December, 1928, pp. 3241-3246.

The synthesis of *meso*-alkyl and *meso*-aryl derivatives of anthracene. V.—E. de Barry Barnett and N. F. Goodway. *J. Chem. Soc.*, January, pp. 20-23.

Anthoxanthins. VIII.—A synthesis of morin and of 5:7:2<sup>1</sup>:4<sup>1</sup>-tetrahydroxyflavone. R. Robinson and K. Venkataraman. IX.—Syringetin. T. Heap and R. Robinson. X.—The synthesis of gossypetin and of quercetagenin. *J. Chem. Soc.*, January, pp. 61-67, 67-73, 74-84.

Reduction products of the hydroxyanthraquinones.—X. R. W. Hardacre and A. G. Perkin. *J. Chem. Soc.*, January, pp. 180-193.

## United States

ANALYSIS.—Detection and identification of specifications with sodium alizarinsulphonate reagent. F. G. Germuth and C. Mitchell. *American J. Pharmacy*, January, pp. 46-52. Sodium alizarinsulphonate is particularly sensitive towards the ions of uranium, platinum (ic), tin (ic), titanium (ous), aluminium, bismuth, iron (ic), chromium (ic), copper (ic), mercury (ic), and thallium.

Some Mackey tests on cottonseed oils. H. Aspegren. *Oil and Fat Industries*, January, pp. 19-23. The test may have some value as an index of keeping qualities.

Determining fish-oils unsaponifiable. W. H. Dickhart. *Oil and Fat Industries*, January, p. 36.

DRYING.—The drying of solids.—I. T. K. Sherwood. *Ind. and Eng. Chem.*, January 1, pp. 12-16. The possible ways in which the drying of a solid takes place are classified under four cases; evaporation of water may take place at the solid surface or at points within the solid structure; and under each heading the possibilities occur of the resistance to internal liquid diffusion being great or small as compared with the total resistance to removal of vapour. The drying of a particular material is not necessarily restricted to one case, as the mechanism may change from one case to another as the drying proceeds.

DYES AND DYEING.—The effect of pH in scouring and dyeing upon resulting shades of viscose. C. E. Mullin. *American Dyestuff Reporter*, January 21, pp. 64-66.

New developments in vat colours. E. Schwarz. *American Dyestuff Reporter*, January 21, pp. 67-70.

GENERAL.—Bleaching cotton with hydrogen peroxide. H. G. Smolens. *American Dyestuff Reporter*, January 21, pp. 49-50.

An attempt to prepare mercury compounds of triphenylmethane dyes. F. R. Greenbaum. *American J. Pharmacy*, January, pp. 34-46. Mercurated derivatives of Brilliant Green, Malachite Green, Gentian Violet, Night Blue, and Basic Fuchsine have been prepared.

A study of water-miscible mineral oil preparations: Textile oils, leather oils, metal cutting oils, etc. R. Hart. *Ind. and Eng. Chem.*, January, pp. 85-90. It is shown that the manufacture of clear water-miscible or "soluble" mineral oils is primarily a problem in miscibility, and that free oleic acid is essential to a uniform product. Miscibility curves for several emulsifiers, mineral oil, and oleic acid are given, by means of which uniform and non-uniform mixtures were traced.

OILS.—"Virgin olive oil: What does it mean?" S. Musher. *Oil and Fat Industries*, January, pp. 25-26, 33.

RAYON.—The mercerisation of rayon pulp. A. Lottermoser and H. Radestock. *American Dyestuff Reporter*, January 21, pp. 53-54, 74-75. A discussion of the effect of time, temperature, and concentration of caustic soda during the mercerisation of wood pulp, with special reference to its use in rayon manufacture. The effect of the type of alkali is also considered. In each case the maximum swelling takes place at the same concentration of alkali as of the maximum alkali absorption.

## German

ANALYSIS.—The determination of maltose and glucose. W. Braun and B. Bleyer. *Zeitschrift analytische Chem.*, Vol. 76, Parts 1-2, pp. 1-38.

The volumetric determination of arsine. H. Kubina. *Zeitschrift analytische Chem.*, Vol. 76, Parts 1-2, pp. 39-48.

The gravimetric determination of arsenic in the presence of organic substances, halogens, and heavy metals. E. Schulek and P. von Villecz. *Zeitschrift analytische Chem.*, Vol. 76, Parts 3-4, pp. 81-103.

A method for the quantitative determination of turpentine vapour in the air. W. D. Bogatsky and W. A. Biber. *Zeitschrift analytische Chem.*, Vol. 76, Parts 3-4, pp. 103-108.

The microtitrimetric determination of bismuth. J. Straub. *Zeitschrift analytische Chem.*, Vol. 76, Parts 3-4, pp. 108-112.

The determination of the sulphur content of gases, especially coke oven gas. F. Heinrich and F. Petzold. *Zeitschrift analytische Chem.*, Vol. 76, Parts 3-4, pp. 120-134. The gas is passed through alkaline hydrogen peroxide at a rate of 0.2 litres per minute. All the inorganic and organic sulphur except that present as thiophen separates, and may be determined by its volume.

The separation of beryllium from aluminium, iron and copper by means of orthohydroxyquinoline. M. Nieszner. *Zeitschrift analytische Chem.*, Vol. 76, Parts 3-4, pp. 135-145.

COLORIMETRY.—Some comparative colorimetric investigations. R. Wasmuth. *Zeitschrift angewandte Chem.*, February 2, pp. 133-134.

GENERAL.—The influence of sugars on the stability of sulphite solutions. E. Häggglund. *Berichte*, January 12, pp. 84-90.

The manufacture of "conversion" saltpetre (potassium nitrate from sodium nitrate). F. Chemnitz. *Chemiker-Zeitung*, January 30, pp. 85-86.

Investigations on the damage to vegetation by smoke. K. Noack. *Zeitschrift angewandte Chem.*, February 2, pp. 123-126.

ORGANIC.—Anthraquinone-1:5-dicarboxylic acid and some simple and mixed anthraquinone carboxylic acid anhydrides. R. School, S. Hass, and K. H. Meyer. *Berichte*, January 9, pp. 107-115.

The production of aldehydes and ketones by means of the degradation of quaternary ammonium bases. J. von Braun and W. Teuffert. *Berichte*, January 9, pp. 235-241.

Benzopolymethylene compounds. XV.—The constitution and synthesis of fluoranthrene. J. von Braun and A. Ernst. *Berichte*, January 12, pp. 145-151.

The ozonisation of nopinene and sabinene. H. Schmidt. *Zeitschrift angewandte Chem.*, February 2, pp. 126-127. By ozonisation and hydrolysis, nopinene yields nopinone, while sabinene yields sabinaketone.

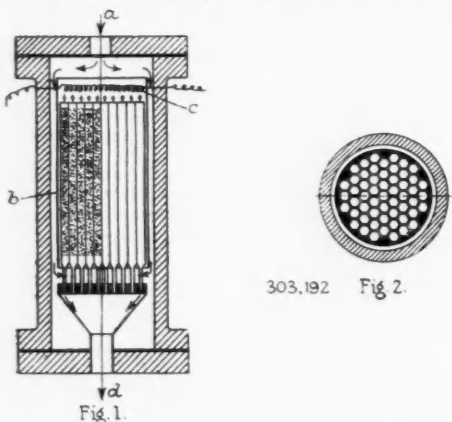
## Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

### Abstracts of Complete Specifications

- 303,192. CARRYING OUT EXOTHERMIC GAS REACTIONS, APPARATUS FOR. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, September 23, 1927.

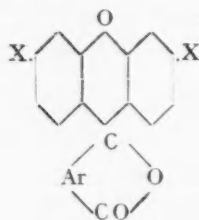
The apparatus is for obtaining improved regeneration and distribution of the heat liberated in exothermic catalytic gas reactions. Gas enters the reaction vessel at *a* and flows along the inside of the walls until it reaches the end of a guide tube *b*. The gas then passes upwards through the intermediate spaces between a bundle of tubes containing the catalyst, and then passes if required



over an electric heater *c*, and then downwards through the catalyst in the tubes. The heat of the reaction is transmitted to the fresh gas flowing in the opposite direction on the outside, and the products are drawn off at *d*. The spaces between the tubes may contain inert fillers such as iron rods to increase the velocity of the gas, or hexagonal tubes may be used as shown in Fig. 2, so that only narrow flat spaces may be left between the walls. Alternatively, the walls may be entirely in contact, in which case some of the tubes are left empty or charged with fillers to heat the upwardly flowing gases. A modified apparatus is described in which the fresh gases and the gases passing over the catalyst both flow in the same direction.

- 303,243. BASIC AND ACID DYES OF THE RHODAMINE TYPE. Imperial Chemical Industries, Ltd., Nobel House, Buckingham Gate, London, S.W.1, and L. J. Allchin, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, November 7, 1927.

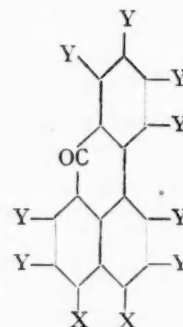
Basic dyes are obtained by the condensation of a fluorescein dihalide of the general structure



where *X* is a halogen and *Ar* is a divalent aryl residue, with an unsulphonated aminophenol or a homologue or substituted product (except the aminophenol ethers). These dyes are capable of sulphonation to obtain new acid rhodamines. The same products can be obtained by condensation of a hydroxy-aryl-*m*-aminophenol with a phthalic anhydride. These products are usually yellower in shade owing to the formation of by-products.

- 303,203. VAT DYE STUFFS AND INTERMEDIATE PRODUCTS, MANUFACTURE OF. A. Carpmal, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application dates, September 30, 1927, and June 19, 1928.

New derivatives of benzanthrone are obtained containing one or more aryl-sulphamino groups (aryl-SO<sub>2</sub>NH) in the molecule by treating a corresponding amino derivative with an aryl-sulpho-chloride, or by condensing a corresponding halogenated derivative with an aryl sulphamide, preferably with the addition of an acid-neutralising agent and a catalyst, in the presence of a diluent. These derivatives are converted into vat dyestuffs by treating with alkaline condensing agents. The benzanthrone compounds correspond to the general formula



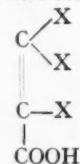
in which *X* represents hydrogen or hydrogen and a substituent separating during the reaction, *Y* represents hydrogen, one or more atoms of which may be replaced by a non-reactive monovalent substituent, at least one *X* or *Y* standing for an arylsulphamino group. The starting material may be an arylsulphamino derivative of a dibenzanthronyl or of a dibenzanthronyl sulphide having free 2- or Bzl- positions. In this case more uniform products are obtained. The products give bluish-olive-grey-black shades on cotton, and examples are given.

- 303,263. DESICCATING MATERIAL, MANUFACTURE OF. H. Wade, London. From E. Thomas, Woolworth Building, New York. Application date, December 9, 1927.

A dehydrating material consists of magnesium perchlorate deposited on barium perchlorate as a carrier. The barium perchlorate may be obtained by heating barium hydroxide, having 8 molecules of water, with crystallised ammonium perchlorate. The material is as efficient as phosphorus pentoxide and can be regenerated by drying. Some examples are given.

- 303,389. CARBOXYLIC ACIDS OF THE FATTY AROMATIC SERIES, MANUFACTURE OF. A. Carpmal, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, July 1, 1927.

These compounds, which are intermediates for the production of dyestuffs and pharmaceutical products, are obtained by heating an unsaturated acid compound of the type



in which *X* represents hydrogen which may be replaced by a monovalent substituent such as halogen, alkyl, aryl, a further carboxylic group, etc., with a polycyclic aromatic hydrocarbon containing more than two condensed benzene nuclei, or a substitution product, in the presence of an acid condensing

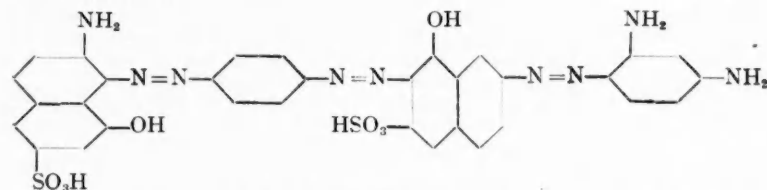
agent and/or diluent. In a modification, the starting substance may be a haloid hydrogen addition product of the unsaturated acid. Examples are given of the treatment of acrylic acid with anthracene,  $\beta$ -chloro-propionic acid with anthracene, and several others.

- 303,281. SULPHONATED PRODUCTS, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, January 13, 1928.

Paraffin hydrocarbons, waxes, etc., are oxidised by air or oxygen and the oxidation products separated. The oxidation products are then sulphonated to obtain soap-like products for use in the textile industry as emulsifying agents, etc. The oxidation product may first be subjected to saponification, and the saponified and unsaponified portions sulphonated separately or together. Examples are given.

- 303,424. BLACK TRISAZO DYESTUFF, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, September 1, 1927.

This dyestuff is obtained by diazotising *p*-amino-benzene-azo-2-amino-8-naphthol-6-sulphonic acid prepared by acid coupling, coupling with 2-amino-8-naphthol-6-sulphonic acid, the resulting disazo dyestuff being diazotised again and coupled with *m*-phenylene-diamine. The probable formula of the dyestuff is



and it gives pure black dyeings of good fastness on cotton and artificial silk other than acetate silk. It may thus be used on mixed fabrics of acetate silk and other artificial silks or cotton to obtain colour effects. Examples are given. Reference is directed in pursuance of Section 7, Sub-section 4, of the Patents and Designs Acts, 1907 to 1928, to Specifications Nos. 20,278 of 1897, 7,330 of 1893, and 19,743 of 1892.

- 303,454. BENZANTHRONE DERIVATIVES, PRODUCTION OF. I. B. Anderson, J. Thomas, R. F. Thomson and Scottish Dyes, Ltd., Earl's Road, Grangemouth, Stirling. Application dates, June 24 and July 20, 1927.

Isodibenzanthrone or substituted isodibenzanthrones are produced from benzanthrone or substituted benzanthrone having the peri positions free, or from 2:2'-dibenzanthronyl, by means of caustic potash and an alcohol as condensing agent, at temperatures below, 130° C., in the presence of a solvent or diluent. The starting material may be benzanthrone, 6-methyl-benzanthrone, certain chlorobenzanthrones, etc. The solvent may be xylene, benzene, halogenated aromatic hydrocarbons, *e.g.*, monochlorobenzene, kerosene, or petrol. Examples are given. Reference is directed in pursuance of Section 7, Sub-section 4 of the Patents and Designs Acts of 1907 to 1928, to Specification No. 247,261.

- 303,455. AMMONIUM PHOSPHATES, PRODUCTION OF. J. Y. Johnson. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, July 4, 1927.

Ammonium phosphates are obtained from soluble calcium phosphates such as raw phosphates by treating them with an acid, such as hydrochloric, the calcium salt of which is soluble in water. The solution is neutralised to slightly acid reaction to precipitate mono- or di-calcium phosphate, and the precipitate separated. This precipitate is treated with ammonia, or ammonia and carbon dioxide, or an ammonium salt such as ammonium fluoride, to obtain the sparingly soluble calcium compound. The solution of ammonium phosphates is concentrated to obtain mono- or diammonium phosphate.

- 303,459. SULPHURIC ACID, MANUFACTURE OF. S. Robson, The Bungalow, St. Andrews Road, Avonmouth, Gloucester, B. Lambert, "Fircroft," Park Town, Oxford, and National Processes, Ltd., 27, Old Broad Street, London, E.C.2. Application date, October 3, 1927.

In the contact process of the oxidation of  $\text{SO}_2$  to  $\text{SO}_3$  the

catalyst or oxidising medium employed is that described in Specification No. 301,853 (see THE CHEMICAL AGE, Vol. XX, p. 52). This necessitates only a simplified purification of the gases to remove dust or suspended matter which would otherwise deposit on the oxidising medium, and the gases are then subjected directly to oxidation. Electrostatic dust separators may be used, and the gases then treated without washing, drying, or cooling.

- 303,467. SUBSTITUTED INDOLES, PROCESS FOR THE MANUFACTURE OF. A. Carpmal, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, October 4, 1927.

A mono-acyl-amino compound of the aromatic series having a methyl group in ortho position to the acyl-amino group, or an alkali compound thereof, is heated with sodamide in the presence of a diluent, which may be a tertiary aromatic amine, at a temperature of 180-205° C. Part of the sodamide may be replaced by metallic sodium. Examples are given of the production of  $\alpha$ -methyl-indole, 2:5-dimethyl-indole, 2:7-dimethyl-indole, and 2-phenyl-indole.

- 303,468. WHITE TITANIC ACID, MANUFACTURE OF. A. Carpmal, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, October 4, 1927.

Precipitated titanic acid which has been purified from iron may become a yellowish or brownish tint on calcination owing to traces of iron still remaining. In the present invention, a white titanic acid which is stable at incandescence is obtained. The reducing agent employed during hydrolysis is sulphurous acid which does not convert the tetravalent titanium into the tervalent form if employed in sufficient amount to reduce the tervalent iron to bivalent iron and also all other oxidising agents present, including dissolved oxygen, but not the tetravalent titanium. Further, in the washing following the hydrolysis, sufficient reducing agent must be present to prevent reoxidation of the iron. In a modification, a strong reducing agent may first be employed up to the point at which the titanium is just maintained in the tetravalent form, and the weaker reducing agent is then employed to complete the reduction. Details are given.

- 303,469. CYANOGEN CHLORIDE, MANUFACTURE OF. A. Carpmal, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, October 4, 1927.

Sodium cyanide solution is treated with chlorine hydrate  $\text{Cl}_2\text{H}_2\text{O}$ , preferably at 0° C., in the presence of sodium, potassium, or calcium chloride to lower the freezing point. The chlorine hydrate may be produced by passing chlorine into salt solution which may contain carbon tetrachloride to precipitate chlorine hydrate. Sodium cyanide is then added.

- 303,535. VULCANIZATION ACCELERATORS. Imperial Chemical Industries, Ltd., Broadway Buildings, Westminster, London, S.W.1., and W. J. S. Naunton, and J. B. Payman, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, August 31, 1927.

Morpholine or its C-substitution derivatives are treated with carbon disulphide in the usual manner for the preparation of dithiocarbamates. The product on oxidation yields the corresponding thiuram disulphide, or it may be treated with a zinc salt capable of forming an insoluble dithio-carbamate or with sulphur chloride to obtain a thiuram poly-sulphide. These compounds are vulcanisation accelerators which do not induce "scorching" during the preliminary working up of the rubber compound.

- 303,538. DIBENZANTHRONE, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, September 6, 1927.

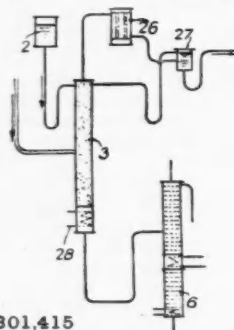
An improved yield of dibenzanthrone is obtained by treating benzanthrone with fused caustic alkali in the presence of aliphatic aldehydes which are not sugars, their polymerisation products, or sulphurous or sulphonylic acid compounds of the aldehydes. Suitable compounds are sodium-formaldehyde-sulphoxylate, zinc-formaldehyde-sulphoxylate, zinc-acetaldehyde-sulphoxylate, sodium-formaldehyde-bisulphite, sodium-glyoxal-bisulphite, etc.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—273,757 (I.G. Farbenindustrie Akt.-Ges.) relating to aqueous solutions of organic compounds insoluble in water, see Vol. XVII, p. 242; 276,372 (I.G. Farbenindustrie Akt.-Ges.) relating to arylazo diarylamines, see Vol. XVII, p. 399; 278,745 (General Carbonalpha Co.) relating to manufacture of hydrocarbons, see Vol. XVII, p. 536; 280,184 (Holzverkohlungs Industrie Akt.-Ges.) relating to acetone, see Vol. XVIII, p. 35; 280,956 (Schering Kahlbaum Akt. Ges.) relating to thymol or an isomer, and hydrogenation products, see Vol. XVIII, p. 85; 294,975 (Selden Co.) relating to contact sulphuric acid process, see Vol. XIX, p. 323.

#### International Specifications not yet Accepted

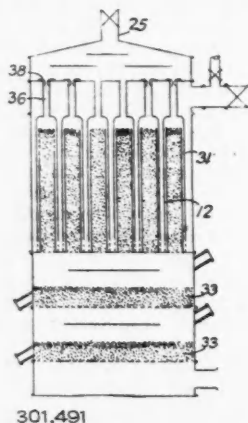
301,415. ACETIC ACID. Soc. Anon. des Distilleries des Deux-Sevres, Melle, Deux Sèvres, France. International Convention date, November 29, 1927. Addition to 296,974.

The process is for obtaining acetic acid from its aqueous solutions by means of a solvent such as amyl acetate having a boiling point above that of acetic acid but below 150° C.,



when the acetic acid contains mucilaginous matter. The vaporised acid is passed into the middle of the column 3, which receives solvent from the tank 2. The column is heated at 28, and water and solvent vapours are drawn off at the top and condensed at 26. The mixture separates into two layers in 27, and the solvent is returned to the column. A mixture of solvent acetic acid, and a small quantity of water is drawn off from the bottom of the column 3 to a column 6, the rest of the process being the same as in specification 296,974 (see THE CHEMICAL AGE, Vol. XIX, p. 466).

301,491. CATALYTIC APPARATUS. Selden Co., McCartney Street, Pittsburg, U.S.A. (Assignees of A. O. Jaeger, 9, North Grandview Avenue, Crafton, Pa., U.S.A.). International Convention date, December 2, 1927.



The gases first pass downwards over tubes 31 placed over the catalyst tubes 12, then into them through openings in the lower part, and then upwards over the tubes 12 to enter the catalyst at the top. Some of the gases may be directly

admitted to the catalyst through inlet 25 and tubes 36, the distribution being controlled by plugs. The gases may 38, then pass through catalyst layers 33 which are not cooled by the incoming gases.

301,500. PHOSPHORUS PENTASULPHIDE. P. Dutoit, Case Ville, Lausanne, Switzerland. International Convention date, December 1, 1927.

Iron phosphide,  $\text{Fe}_3\text{P}$ , is treated at 700-800° C. with sulphur vapour obtained from iron pyrites mixed with the phosphide. The vapours are cooled to obtain phosphorus pentasulphide.

301,726. DYES. J. R. Geigy Soc. Anon., 51, Riehenring, Basle, Switzerland. International Convention date, December 3, 1927.

Tetrazotised diamines of the type  $\text{NH}_2$ , R,  $\text{CH}_2$ , R,  $\text{NH}_2$  or  $\text{NH}_2$ , R,  $\text{CHR}^1$ , R,  $\text{NH}_2$  in which R and  $\text{R}^1$  are substituted or unsubstituted aryl residues are coupled with unsulphonated components to obtain diazo dyes, soluble in oil or fat. The diamido base from benzaldehyde and *o*- or *m*-toluidine or *p*-xylylidine- $\beta$ -naphthol is an example.

301,727. SYNTHETIC DRUGS. Chemical Works, formerly Sandoz, Basle, Switzerland. International Convention date, December 3, 1927.

Double compounds of C: C-disubstituted barbituric acids with 1-phenyl-2:3-dimethyl-4-dialkylamino-5-pyrazolones are obtained by interaction of their salts in a saturated aqueous solution of the pyrazolone. Examples are given.

301,734. ACETIC AND OTHER ALIPHATIC ACIDS. British Celanese, Ltd., 22, Hanover Square, London. (Assignees of H. E. Martin, Cumberland, Md., U.S.A.). International Convention date, December 3, 1927.

Acetic, propionic, and other acids are concentrated by extracting the acid with methylene chloride, and then distilling the extract to obtain the solvent and acid.

301,751. MAGNESIA. Sabzbergwerk Neu-Stassfurt, Stassfurt, Germany. International Convention date, December 3, 1927.

Burnt dolomite is treated with waste liquor from the Solvay soda process, containing ammonium chloride, to extract the calcium compounds, and thereby obtain magnesia.

301,806. OXYGENATED CARBON COMPOUNDS. E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. (Assignees of W. A. Lazier, 1001, Gilpin Avenue, Wilmington, Del., U.S.A.). International Convention date, June 12, 1926.

This invention consists of catalysts for the reaction of carbon monoxide with hydrogen or steam, or the dehydrogenation of ethyl alcohol, etc. A double chromate of a nitrogenous base and zinc, copper, cadmium, magnesium, manganese, silver, or iron, is heated to decomposition. The product is leached with 5-10 per cent. acetic acid. Catalysts are described from basic zinc ammonium chromate, zinc bichromate tetrapyridine, and manganese ammonium chromate.

301,845. SYNTHETIC DRUGS. Soc. des Usines Chimiques Rhône-Poulenc, 21, Rue Jean Goujon, Paris. (Assignees of Etablissements Poulenc Frères, E. Fourneau, and J. Trefouel, 86, Rue Vieille du Temple, Paris). International Convention date, December 6, 1927.

The *m*-aminobenzoyl group is introduced into the hydroxyl group of ethyl-dimethylamino-methyl carbinol in known manner to obtain *m*-aminobenzoyl-ethyl-dimethylamino-methyl-carbinol, which possesses anaesthetic properties.

301,864. PHOSPHORIC ACID, SOLUBLE PHOSPHATES AND CALCIUM SULPHATE. Kunstdünger-Patent-Verwertungs Akt.-Ges., Glarns, Switzerland. (Assignees of F. G. Liljenroth, 12, Danderydsgatan, Stockholm). International Convention date, December 7, 1927.

Raw phosphates are leached to obtain phosphoric acid or soluble phosphates, and the calcium separated as sulphate. If a temperature of 95° C. is maintained, the sulphate is obtained in crystalline form which settles rapidly, and concentrated solutions may be used.

301,898. DIOLEFINS. I.G. Farbenindustrie Akt.-Ges. Frankfurt-on-Main, Germany. International Convention date, December 9, 1927. Addition to 291,748. (See THE CHEMICAL AGE, Vol. XIX, p. 127).

The vapour of 1:3-butylene glycol or a homologue is passed over acid salts such as aluminium sulphate or acid phosphates such as  $\text{K}_2\text{H}_2\text{PO}_4$  or  $\text{K}_2\text{H}_2\text{P}_2\text{O}_7$ , at 400-410° C. to obtain butadiene and its homologues.

## LATEST NOTIFICATIONS.

- 304,640. Catalytic reduction of organic nitrogen compounds. Selden Co. January 23, 1928.
- 304,744. Manufacture of azo-dyestuffs. I.G. Farbenindustrie Akt.-Ges. January 26, 1928.
- 304,681. Method of preparing products of acrylic acid or its derivatives. Röhm and Haas Akt.-Ges. January 24, 1928.
- 304,648. Hardening of condensation products from phenols and aldehydes. Schmidt, Dr. F. January 23, 1928.
- 304,688. Apparatus for producing sulphuric acid. Mansfeld Akt.-Ges. für Bergbau und Hüttenbetrieb, Krebs, Dr. H., and Borchers, Dr. R. January 24, 1928.
- 304,767. Process for printing with dyestuffs photographic gelatin layers. I.G. Farbenindustrie Akt.-Ges. January 27, 1928.
- 304,659. Phenol resin, and process of making the same. Bakelite Corporation. November 11, 1926.
- 304,727. Process for the manufacture of alkylene-substituted phenols. Schering-Kahlbaum Akt.-Ges. January 25, 1928.
- 304,667. Process of an apparatus for making bands of artificial fibres. I.G. Farbenindustrie Akt.-Ges. January 23, 1928.
- 304,697. Process for the production of dried superphosphate. Chemische Industrie Akt.-Ges., and Meyer, H. January 24, 1928.
- 304,732. Process for the manufacture of basic phenol alkyl ethers. I.G. Farbenindustrie Akt.-Ges. January 25, 1928.
- 304,739. Process for dyeing cellulose esters or cellulose ethers or transformation products thereof. I.G. Farbenindustrie Akt.-Ges. January 25, 1928.
- 304,787. Process for printing with vat-dyestuffs. I.G. Farbenindustrie Akt.-Ges. January 26, 1928.
- 304,741. Immunizing-agents for wood, grain, or the like. I.G. Farbenindustrie Akt.-Ges. January 25, 1928.
- 304,742. Reserving of wool in dyeing with substantive dyestuffs. I.G. Farbenindustrie Akt.-Ges. January 25, 1928.
- 304,791. Manufacture of finely-divided active carbon. I.G. Farbenindustrie Akt.-Ges. January 26, 1928.
- 304,704. Manufacture of a vat-dyestuff. I.G. Farbenindustrie Akt.-Ges. January 26, 1928.
- 305,033. Chemical reaction apparatus. Huessy, W. January 28, 1928.
- 305,043. Manufacture of stable polymerisation products from vinyl esters. I.G. Farbenindustrie Akt.-Ges. January 28, 1928.
- Specifications Accepted with Date of Application.**
- 277,371. Pigment dyes, Manufacture of. I.G. Farbenindustrie Akt.-Ges. September 11, 1926.
- 279,489. Vat-dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. October 23, 1926.
- 280,553. N-monoalkyl derivatives of the aminophenols, Production of. W. Traube and E. Hellriegel. November 15, 1926.
- 280,924. Thymol, its isomers or homologues, and their hydrogenation products, Manufacture of. Schering Kahlbaum Akt.-Ges. November 16, 1926. Addition to 276,010.
- 282,634. Purifying gases from organically combined sulphur. F. Fischer. December 24, 1926.
- 283,163. Organic bases, Manufacture of. I.G. Farbenindustrie Akt.-Ges. January 5, 1927.
- 283,177. Hydrocarbons from coal and water, Process and apparatus for the production of. A. Uhlmann. January 6, 1927.
- 284,685. Protection of copper apparatus against corrosion by carboxylic acids. Soc. Chimique des Usines du Rhône. February 4, 1927.
- 291,419. Catalytic oxidation of organic compounds. Selden Co. June 3, 1927.
- 304,174. Ores, Reduction of. F. L. Duffield. October 10, 1927.
- 304,263. Benzantraquinone derivatives and substitution products, Manufacture of. A. Carpmal. (I.G. Farbenindustrie Akt.-Ges.). October 18, 1927.
- 304,251 and 304,269. Catalyzing gaseous reactions, Methods of and apparatus for. H. Wade. (Silica Gel Corporation). July 12, 1927.
- 304,343. Production of liquid hydrocarbons by the carbonisation and hydrogenation of carbonaceous materials. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.). October 17, 1927.
- 304,345. Coal distillation gases, Treatment of. Imperial Chemical Industries, Ltd., K. Gordon and J. Hughes. October 17, 1927.
- 304,350. Oxidation of volatile organic compounds. Imperial Chemical Industries, Ltd., S. W. Rowell and H. S. Hirst. October 18, 1927.
- 304,360. Di-substituted guanidines, Manufacture of. A. Carpmal. (I.G. Farbenindustrie Akt.-Ges.). October 19, 1927.
- 304,371. Nickel and nickel alloys. W. E. Beatty. (Bell Telephone Laboratories, Inc.). October 20, 1927.
- 304,403. Hydrogenation of naphthalene. Technical Research Works, Ltd. and E. J. Lush. November 4, 1927.
- 304,421. Low boiling oils and cyanides, Manufacture of. J. C. Clancy. November 21, 1927.
- 304,436. Salts of acid sulphuric esters of nitro-9:10-dihydroxy-anthracenes, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.). December 9, 1927.
- 304,439. 2:3-amino-naphthol and derivatives thereof, Manu-

facture of. O. Y. Imray. (I.G. Farbenindustrie Akt.-Ges. December 15, 1927.

- 304,441. Naphthol-ether carboxy-amides and aminonaphthol ethers, Manufacture of. O. Y. Imray. (I.G. Farbenindustrie Akt.-Ges.). December 19, 1927.
- 304,498. Finely divided sulphur, Production of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.). February 20, 1928. Addition to 177,103.
- 279,128. Hydrogen, Method of preparing. H. Bomke. October 16, 1926.

## Applications for Patents

- Adam, W. G., Cuckney, M., Gas Light and Coke Co., and Shannan. W. V. Catalytic oxidation of organic, etc., compounds. 2,995. January 29.
- Akt.-Ges. für Stickstoffdünger und Imray, O. Y. Manufacture of acetic acid. 3,024. January 29.
- Bakelite Ges. Production of articles from urea, etc. 2,902. January 28. (Germany, February 3, 1928.)
- Bakelite Ges. Production of phenol-aldehyde resins, etc. 3,582. February 2. (Germany, February 3, 1928.)
- Beckett, E. G., Scottish Dyes, Ltd., Thomas, J., and Woodcock, W. G. Dyestuffs etc. 3,315. January 31.
- Beckett, E. G., Scottish Dyes, Ltd., Thomas, J., and Wilson, J. S. Vat dyestuffs, etc. 3,580. February 2.
- Bensa, F. Dyes. 2,901. January 28. (Austria, January 31, 1928.)
- Blumenfeld, J. Separation of titanium dioxide hydrate from hydrolysable solutions of titanium. 2,896. January 28. (Czechoslovakia, May 5, 1928.)
- Bromig, K. and Deutsche Gold und Silber-Scheideanstalt vorm. Roessler. Obtaining glutamic acid. 3,312. January 31.
- Carmal, A. and I.G. Farbenindustrie Akt.-Ges. Polymerisation of butadiene homologues etc. 3,029. January 29.
- Carmal, A. and I.G. Farbenindustrie Akt.-Ges. Manufacture of aluminium fluoride. 3,198. January 30.
- Hardacre, R. W., Imperial Chemical Industries, Ltd., and Perkin, A. G. Manufacture of anthraquinone derivatives. 3,063. January 29.
- Hooley, L. J., Scottish Dyes, Ltd., and Thomas, J. Dyestuffs, etc. 3,187. January 30.
- I.G. Farbenindustrie Akt.-Ges. and Imray, O. Y. Manufacture of ketones. 2,865. January 28.
- I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of fermentable sugar solutions. 2,871. January 28.
- I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of colouring materials. 3,150. January 30.
- I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Separation of hydrogen from gaseous mixtures. 3,151. January 30.
- I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of glues from yeast. 3,152. January 30.
- I.G. Farbenindustrie Akt.-Ges. Manufacture of aryl-carboxy-amido orthothioglycolic acids. 3,199. January 30. (Germany, January 31, 1928.)
- I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of phosphoric acid esters. 3,301, 3,302. January 31.
- I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of wetting agents, etc. 3,303. January 31.
- I.G. Farbenindustrie Akt.-Ges. Manufacture of emulsions of diolefines. 3,437. February 1. 3,347. February 1. (June 1, 1928.)
- I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of hydrocarbons. 3,441. February 1.
- I.G. Farbenindustrie Akt.-Ges. Manufacture of polymerisation products from vinyl esters. 2,867. January 28. (Germany, January 28, 1928.)
- I.G. Farbenindustrie Akt.-Ges. Kinematograph-film boxes. 3,026. January 29. (Germany, February 2, 1928.)
- I.G. Farbenindustrie Akt.-Ges. Manufacture of esters of polymerized carbohydrates. 3,027. January 29. (Germany, February 10, 1928.)
- I.G. Farbenindustrie Akt.-Ges. Manufacture of condensation products from acetylene. 3,165. January 30. (Germany, July 27, 1928.)
- I.G. Farbenindustrie Akt.-Ges. Manufacture of paints. 3,166. January 30. (Germany, February 2, 1928.)
- I.G. Farbenindustrie Akt.-Ges. Manufacture of silver-halide emulsions. 3,307. January 31. (Germany, January 31, 1928.)
- I.G. Farbenindustrie Akt.-Ges. Manufacture of monoazo dyestuffs. 3,342. January 31. (Germany, February 1, 1928.)
- I.G. Farbenindustrie Akt.-Ges. Dyeing piece goods and yarns. 3,466. February 1. (Germany, February 2, 1928.)
- Imperial Chemical Industries, Ltd. Welding copper. 2,967. January 29.
- Imperial Chemical Industries, Ltd., Rodd, E. H., and Whinch, F. Lakes of triarylmethane dyestuffs. 3,311. January 31.
- Imperial Chemical Industries, Ltd. Method of absorbing hydrogen cyanide from gases. 3,376. February 1.
- Imperial Chemical Industries, Ltd. Production of dehydrogenated products from hydrocarbons, etc. 3,377.
- Imperial Chemical Industries, Ltd. Laundering processes. 3,497. February 1.

## Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

### General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.  
 ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.  
 ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.  
 ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.  
 ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.  
 AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.  
 BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.  
 BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.  
 BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)  
 CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.  
 COPPER SULPHATE.—£25 to £25 10s. per ton.  
 METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.  
 NICKEL SULPHATE.—£38 per ton d/d.  
 NICKEL AMMONIA SULPHATE.—£38 per ton d/d.  
 POTASH CAUSTIC.—£30 to £33 per ton.  
 POTASSIUM BICHROMATE.—4½d. per lb.  
 POTASSIUM CHLORATE.—3½d. per lb., ex-wharf, London, in cwt. kegs.  
 SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.  
 SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.  
 SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.  
 SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.  
 SODIUM ACETATE 97/98%.—£21 per ton.  
 SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.  
 SODIUM BICHROMATE.—3½d. per lb.  
 SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.  
 SODIUM CHLORATE.—2½d. per lb.  
 SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.  
 SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.  
 SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.  
 SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.  
 SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.  
 SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

### Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, Jan., 1s. 11d. per gall.; Feb./Mar., 1s. 10½d. per gall.  
 ACID CRESYLIC 99/100.—2s. 5d. to 2s. 10d. per gall. 97/99.—2s. 2d. to 2s. 3d. per gall. Pale, 95%, 1s. 11d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d.  
 ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £5 per ton.  
 ANTHRACENE OIL, STRAINED.—7½d. to 8d. per gall. Unstrained, 7½d. to 7¾d. per gall.  
 BENZOLE.—Prices at works: Crude, 10d. to 10½d. per gall.; Standard Motor, 1s. 4d. to 1s. 4½d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.  
 TOLUOLE.—90%, 1s. 5d. to 1s. 9d. per gall. Firm. Pure, 1s. 10d. to 2s. 2d. per gall.  
 XYLOL.—1s. 3d. to 1s. 11d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.  
 CREOSOTE.—Cresylic, 20/24%, 8½d. per gall.; Heavy, 7d. to 7½d. per gall. Middle oil, 5½d. to 6½d. per gall. Standard specification, 5½d. to 5¾d. per gall. ex works. Salty, 7½d. per gall.  
 NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent, 90/160, 1s. 1½d. to 1s. 2½d. per gall. Solvent, 95/160, 1s. 2d. to 1s. 6d. per gall. Solvent 90/190, 11d. to 1s. 3d. per gall.  
 NAPHTHALENE, CRUDE.—Drained Creosote Salts, £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.  
 NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.  
 PITCH.—Medium soft, 35s. to 36s. per ton, f.o.b., according to district. Nominal.  
 PYRIDINE.—90/140, 4s. 3d. to 6s. 6d. per gall. 90/180, 2s. 3d. to 3s. per gall. Heavy, 1s. 9d. to 2s. per gall.

### Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:  
 ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.  
 ACID ANTHRANILIC.—6s. per lb. 100%.  
 ACID BENZOIC.—1s. 8½d. per lb.  
 ACID GAMMA.—4s. 6d. per lb.  
 ACID H.—3s. per lb.  
 ACID NAPHTHIONIC.—1s. 6d. per lb.  
 ACID NEVILLE AND WINTHER.—4s. 9d. per lb.  
 ACID SULPHANILIC.—8½d. per lb.  
 ANILINE OIL.—8d. per lb. naked at works.  
 ANILINE SALTS.—8d. per lb. naked at works.  
 BENZALDEHYDE.—2s. 3d. per lb.  
 BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.  
 BENZOIC ACID.—1s. 8d. per lb.  
 o-CRESOL 29/31° C.—5½d. per lb.  
 m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.  
 p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.  
 DICHLORANILINE.—1s. 10d. per lb.  
 DIMETHYLANILINE.—1s. 11d. per lb.  
 DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.  
 DINITROCHLOROBENZENE.—£84 per ton d/d.  
 DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.  
 DIPHENYLAMINE.—2s. 10d. per lb. d/d.  
 a-NAPHTHOL.—2s. per lb. d/d.  
 B-NAPHTHOL.—10d. per lb. d/d.  
 a-NAPHTHYLAMINE.—1s. 3d. per lb.  
 B-NAPHTHYLAMINE.—3s. per lb.  
 o-NITRANILINE.—5s. 9d. per lb.  
 m-NITRANILINE.—3s. per lb. d/d.  
 p-NITRANILINE.—1s. 8d. per lb.  
 NITROBENZENE.—6d. per lb. naked at works.  
 NITRONAPHTHALENE.—1s. 3d. per lb.  
 R. SALT.—2s. 2d. per lb.  
 SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.  
 o-TOLUIDINE.—8d. per lb.  
 p-TOLUIDINE.—1s. 9d. per lb. naked at works.  
 m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.  
 N. W. ACID.—4s. 9d. per lb. 100%.

### Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.  
 ACETONE.—£78 per ton.  
 CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.  
 IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.  
 RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.  
 WOOD CRESOTE.—1s. 9d. per gall. Unrefined.  
 WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.  
 WOOD TAR.—£3 10s. to £4 10s. per ton.  
 BROWN SUGAR OF LEAD.—£38 per ton.

### Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.  
 ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.  
 BARYTES.—£5 10s. to £7 per ton, according to quality.  
 CADMIUM SULPHIDE.—5s. to 6s. per lb.  
 CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity  
 CARBON BLACK.—5½d. per lb., ex wharf.  
 CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity, drums extra.  
 CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.  
 DIPHENYLGUANIDINE.—3s. 9d. per lb.  
 INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4½d. to 5½d. per lb.  
 LAMP BLACK.—£32 10s. per ton, barrels free.  
 LEAD HYPOSULPHITE.—9d. per lb.  
 LITHOPHONE, 30%.—£23 per ton.  
 MINERAL RUBBER "RUBPRON".—£13 12s. 6d. per ton, f.o.r. London.  
 SULPHUR.—£10 to £12 per ton, according to quality.  
 SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.  
 SULPHUR PRECIP. B. P.—£55 to £60 per ton.  
 THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.  
 THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.  
 VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.  
 ZINC SULPHIDE.—8d. to 11d. per lb.

### Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.  
 ACID, ACETYL SALICYLIC.—2s. 4½d. to 2s. 5d. per lb.  
 ACID, BENZOIC, B.P. 2s. to 3s. 3d. per lb., according to quantity.  
 Solely ex Gum, 1s. 3d. to 1s. 6d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—2s. 1d. to 2s. 2d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 6d. to 1s. 7d. per lb. Technical.—10½d. to 11½d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 4½d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimed, 1s. per lb.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.

BISMUTH CARBONATE.—9s. 9d. per lb.

BISMUTH CITRATE.—9s. 3d. per lb.

BISMUTH SALICYLATE.—8s. 9d. per lb.

BISMUTH SUBNITRATE.—8s. 3d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.

BISMUTH OXIDE.—12s. 3d. per lb.

BISMUTH SUBCHLORIDE.—10s. 9d. per lb.

BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTH ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb.

BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.

BROMIDES.—Ammonium, 2s. to 2s. 3d. per lb.; potassium, 1s. 8½d. to 1s. 11½d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.

CALCIUM LACTATE.—B.P., 1s. 3d. to 1s. 4d. per lb.

CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. 730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.

FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.

HEXAMINE.—1s. 11d. to 2s. 2d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.

HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 9d. per lb.; potassium, 3s. per lb.; sodium, 2s. 11d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb.; U.S.P., 2s. 9d. to 3s. per lb.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 9½d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 22s. 3d. per lb. net; Synthetic, 11s. to 12s. 6d. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 3d. to 1s. 6d. per lb.

METHYL SULPHONAL.—8s. 9d. to 9s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—2s. 5d. to 2s. 8d. per lb.

PHENAZONE.—3s. 9d. to 4s. per lb.

PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—96s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 6d. to 2s. 9d. per lb.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—47s. per lb.; in quantity lower.

SALOL.—2s. 3d. to 2s. 6d. per lb.

SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.

SODIUM CITRATE, B.P.C., 1911.—2s. 3d. to 2s. 6d. per lb., B.P.C. 1923—2s. 8d. to 2s. 9d. per lb. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 5½d. to 1s. 7d. per lb. Crystal, 1s. 6½d. to 1s. 8d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10s. to 1s. 1d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—6s. 6d. to 6s. 9d. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.

THYMOL.—Puriss., 9s. 6d. to 9s. 9d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb.

### Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.

AUBEPINE (EX ANETHOL).—11s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—4s. 6d. per lb.

AMYL SALICYLATE.—2s. 9d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 3d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL BENZOATE.—2s. 3d. per lb.

CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.

COUMARIN.—8s. 6d. per lb.

CITRONELLOL.—10s. per lb.

CITRAL.—8s. 3d. per lb.

ETHYL CINNAMATE.—6s. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—14s. per lb.

GERANIOL (PALMAROSA).—20s. per lb.

GERANIOL.—6s. 6d. to 10s. per lb.

HELIOTROPINE.—4s. 9d. per lb.

ISO EUGENOL.—16s. per lb.

LINALOL.—Ex Bois de Rose, 13s. per lb. Ex Shui Oil, 9s. 3d. per lb.

LINALYL ACETATE.—Ex Bois de Rose, 17s. 6d. per lb. Ex Shui Oil Linalol, 10s. 6d. per lb.

METHYL ANTHRANILATE.—8s. per lb.

METHYL BENZOATE.—4s. per lb.

MUSK KETONE.—34s. per lb.

MUSK XYLLOL.—7s. per lb.

NEROLIN.—3s. 9d. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—10s. per lb.

RHODINOL.—45s. per lb.

SAFROL.—1s. 8d. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN.—16s. 6d. per lb.

### Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.

ANISE OIL.—2s. 9d. per lb.

BERGAMOT OIL.—23s. per lb.

BOURBON GERANIUM OIL.—21s. per lb.

CAMPHOR OIL.—9d. per lb.

CANANGA OIL, JAVA.—12s. per lb.

CINNAMON OIL LEAF.—7s. per oz.

CASSIA OIL, 80/85%.—6s. 9d. per lb.

CITRONELLA OIL.—Java, 2s. 2d. per lb., c.i.f. U.K. port. Ceylon, pure, 1s. 10½d. per lb.

CLOVE OIL (90/92%).—11s. 6d. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—2s. per lb.

LAVENDER OIL.—Mont Blanc, 48/50%, Esters, 16s. 9d. per lb.

LEMON OIL.—14s. 9d. per lb.

LEMONGRASS OIL.—4s. per lb.

ORANGE OIL, SWEET.—21s. per lb.

OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.

PALMA ROSA OIL.—13s. per lb.

PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 15s. 6d. per lb.; Japanese, 8s. per lb.

PETITGRAIN.—8s. 6d. per lb.

SANDALWOOD.—Mysore, 28s. per lb.; 90/95%, 18s. 9d. per lb.

## London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, February 7, 1929.

THE amount of business booked during the week has been considerable, while markets on the whole are quite firm. The export trade steadily increases.

### General Chemicals

ACETIC ACID.—Business is quite brisk at £36 10s. to £37 10s. per ton for 80%.  
ACETONE.—Supplies are still short, especially for early delivery, with price firm at £77 to £85 per ton, according to quantity.  
ACID CITRIC is rather slow, with price steady at about 2s. 1d. to 2s. 3d. per lb., less 5%.  
ACID FORMIC is rather easier at £42 10s. per ton for 85%.  
ACID LACTIC is unchanged at £43 per ton for 50% by weight.  
ACID OXALIC is in good demand at £30 10s. to £32 10s. per ton, according to quantity.  
ACID TARTARIC.—The steady demand has been maintained at 1s. 4½d. to 1s. 4¾d. per lb., less 5%.  
ALUMINA SULPHATE is firm at £7 to £8 per ton, and is in short supply, particularly for early delivery.  
AMMONIUM CHLORIDE is unchanged, the demand for dog tooth crystals increasing, but supplies are still short for early delivery.  
ARSENIC is unchanged.  
BARIUM CHLORIDE.—A limited quantity is available for prompt delivery at £11 10s. to £12 per ton. The demand remains active, with the position very firm.  
CREAM OF TARTAR.—Price remains unchanged at £95 to £97 per ton for 99/100% B.P.  
COPPER SULPHATE is unchanged.  
FORMALDEHYDE is firm at £39 per ton, and in good demand.  
LEAD ACETATE is unchanged at £42 10s. for white, and £1 per ton less for brown.  
LEAD NITRATE.—At £36 per ton, delivered U.K.  
LIME ACETATE is unchanged at about £18 per ton, but supplies very short.  
LITHOPONE is steady at £19 15s. to £21 per ton.  
METHYL ACETONE is firm at £58 to £60 per ton, with a steady and increasing demand.

POTASH CARBONATE AND CAUSTIC is unchanged and in steady demand.  
POTASH CHLORATE.—At £28 to £30 per ton, with a steady demand.  
POTASH PERMANGANATE.—At 5½d. per lb., and in good demand.  
POTASH PRUSSIAN remains firm at £63 10s. to £65 10s. per ton. Supplies continue short for early delivery.  
SODA ACETATE is unchanged at £21 5s. to £22 5s. per ton, and in brisk demand.  
SODIUM BICHROMATE is unchanged at 3½d. per lb., with rebates for contracts, and with quite a fair amount of contracts booked.  
SODIUM CHLORATE is steady at about £25 per ton. The improved demand continues.  
SODIUM HYPOSULPHITE continues steady, price unchanged.  
SODA NITRATE is in good demand and firm at £20 per ton.  
SODIUM PHOSPHATE is unchanged at £12 per ton for di-basic and £17 10s. for tri-basic.  
SODIUM PRUSSIAN is firm at 4½d. to 5½d. per lb., according to quantity.  
SODIUM SULPHIDE is unchanged.  
TARTAN EMETIC.—The demand is improving, with price unchanged at about 10½d. to 11d. per lb.  
ZINC SULPHATE is steady at £12 per ton.

### Coal Tar Products

There is very little change in prices of coal tar products to report from last week, and the market is still fairly quiet.  
MOTOR BENZOL remains scarce, the price being about 1s. 7½d. to 1s. 8d. per gallon, f.o.r. makers' works.  
SOLVENT NAPHTHA is unchanged at 1s. 1½d. per gallon, f.o.r.  
HEAVY NAPHTHA is quoted at 1s. 1d. to 1s. 1½d. per gallon, on rails.  
CREOSOTE OIL remains at 5½d. per gallon, on rails in the north, and at 6d. per gallon in London.  
CRESYLIC ACID is still weak, the 98/100% quality being obtainable at about 1s. 10d. per gallon, and the dark quality 95/97% at 1s. 8d. per gallon, f.o.b.  
NAPHTHALENES.—The firelighter quality is quoted at about £4 10s. per ton, the 74/76 quality at £5 per ton, and the 76/78 quality at £6 to £6 5s. per ton.  
PITCH is weaker, at 32s. 6d. to 35s. per ton, f.o.b.

### Nitrogen Products

Export.—The demand for sulphate of ammonia continues satisfactory, and the price has advanced to £10 2s. per ton f.o.b. U.K. port in single bags. It is anticipated that the market will be firm, at any rate, until the end of April.

Home.—The end of January witnessed the placing of large orders, as the price advanced on February 1. At the moment orders are small, but it is anticipated that by the middle of the month a large volume of orders will be forthcoming.

Nitrate of Soda.—Good sales continue to be made at scale prices.

### Latest Oil Prices

LONDON, FEBRUARY 6.—LINSEED OIL was steady. Spot, ex mill, £29 15s.; February to April, £28 15s.; May-August, £29; and September-December, £29 10s., naked. RAPE OIL was steady. Crude extracted, £42; technical refined, £44, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £29 10s.; refined common edible, £35; deodorised, £37, naked, ex mill. TURPENTINE was quiet and 6d. to 3d. per cwt. lower. American, spot, 47s. 3d.; February-April, 48s.

HULL, FEBRUARY 6.—LINSEED OIL.—Spot and February, £28 12s. 6d.; March-April, £28 15s.; May-August, £28 17s. 6d.; September-December, £29 2s. 6d. per ton, naked. COTTON OIL.—Bombay (crude), £27 5s.; Egyptian crude, spot (new) and February-April, £27 15s.; edible refined, spot and February-April, £31 15s.; technical, spot, £31 10s.; deodorised, £33 15s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., £36 15s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted, £37; deodorised, £41 per ton. SOYA OIL.—Extracted and crushed, £31 10s.; deodorised, £35 per ton. RAPE OIL.—Crushed/extracted, £41 15s.; refined, spot, £43 15s. per ton. CASTOR OIL.—Pharmaceutical, 50s.; first, 45s.; second, 42s. 6d. barrels, per cwt. net cash terms, ex mill. TURPENTINE and COD OIL unaltered.

### South Wales By-Products

SOUTH WALES by-product activities are unchanged. The market is featureless and most products are quiet with values unchanged, Pitch remains weak with values nominal round the 37s. per ton

mark. Crude tar has a better inquiry at from 28s. to 32s. per ton maker's works, while road tar remains easy at from 12s. to 15s. per 40 gallons barrel. Crude naphthalene has scarcely any call at about 80s. per ton, and a similar remark applies to whizzed at 100s. per ton. Refined tars continue to have a steady call, but values are unchanged, coke oven tar having a quotation of from 7d. to 7½d. per gallon delivered, and gasworks tar of from 6½d. to 7d. per gallon delivered. Patent fuel and coke exports continue to improve, patent fuel exports last week reaching the good total of 69,875 tons. Values are unchanged, patent fuel export quotations, ex-ship Cardiff, being 20s. to 21s. per ton; ex-ship Swansea, 19s. to 19s. 3d. per ton. Coke, best foundry, 32s. 6d. to 36s. 6d.; furnace, 19s. to 21s.; and good foundry from 25s. to 32s. 6d. per ton. Latest oil import figures show a total import of 21,109,662 gallons over the last four ascertainable weeks.

### British Cyanides Co. and Beetle Products

THE British Cyanides Co., Ltd., announce that information has been received from the American Cyanamid Co. that as a result of their investigations and of arrangements concluded with them supplemental to the agreement made by the managing director last November, "they will immediately proceed with the organisation of the new company in America for the manufacture of Beetle moulding powders and make preparations as rapidly as possible to build a plant and start production."

Mr. Glassey, sales director of the Beetle Products Co., is returning from a visit to leading moulders and potential consumers of Beetle mouldings in the U.S.A. The object of his visit has been to assist the American Cyanamid Co. to find an immediate market for the substantial production for which the initial unit will be laid down. Important negotiations are being conducted in other directions and the board hope to be in a position to issue a progress report to the shareholders within the next few weeks. Warrants for the half-yearly dividends on the preference shares will be posted on February 15.

## Scottish Chemical Market

*The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, February 6, 1929.

THE heavy chemical market still shows an active tone and prices for some products are, if anything, a little firmer. Export inquiry remains good. A feature has been inquiry for coal tar products.

### Industrial Chemicals

- ACETONE, B.G.S.—£77 10s. to £85 per ton, ex wharf, according to quantity. There is still little available for immediate delivery.
- ACID ACETIC, 98/100%.—Glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.
- ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £38 per ton, packed in bags, carriage paid U.K. stations.
- ACID CARBOLIC, ICE CRYSTALS.—Quoted 6½d. per lb., delivered, or f.o.b. U.K. ports.
- ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. 2d. to 5s. 8d. per lb., less 5%, ex wharf.
- ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.
- ACID NITRIC, 80%.—Quality, £24 10s. per ton, ex station, full truck loads.
- ACID OXALIC, 98/100%.—3½d. now asked for spot material.
- ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality £5 15s. per ton for 168° quality. Dearsenicated quality, 20s. per ton extra.
- ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 4½d. per lb., less 5% ex wharf. Offered for prompt shipment at 1s. 4d. per lb., less 5%, ex wharf.
- ALUMINA SULPHATE.—On offer at £5 10s. per ton, c.i.f. U.K. ports. Spot material quoted £5 15s. per ton, ex store.
- ALUM, LUMP POTASH.—Quoted £8 7s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent. Crystal meal quoted £8 10s. per ton, ex store.
- AMMONIA ANHYDROUS.—Quoted 9½d. per lb., carriage paid. Containers extra and returnable.
- AMMONIA CARBONATE.—Lump quality quoted £36 per ton; powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.
- AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.
- AMMONIA MURIATE.—Grey galvanisers crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K.
- ANTIMONY OXIDE.—Quoted £36 per ton, c.i.f. U.K. ports. Offered for prompt delivery at about £39 per ton, ex store.
- ARSENIC, WHITE POWDERED.—Quoted £18 10s. per ton, ex wharf, prompt despatch from mines. Spot material on offer at £19 15s. per ton, ex store.
- BARIUM CHLORIDE.—On offer from the Continent at £10 5s. per ton, c.i.f. U.K. ports.
- BLEACHING POWDER.—British manufacturers contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4 ton lots. Continental now offered at about the same figure.
- CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 5s. to £4 15s. per ton, according to quality and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.
- COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.
- COPPER SULPHATE.—Steady, and price about £25 15s. per ton, ex wharf.
- FORMALDEHYDE, 40%.—Some spot material available at about £37 10s. per ton, ex quay.
- GLAUBER SALTS.—English material unchanged at £5 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.
- LEAD, RED.—On offer at £29 10s. per ton, ex store.
- LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.
- LEAD ACETATE.—White crystals quoted £41 10s. per ton. Brown on offer about £39 10s. per ton, ex store.
- MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.
- METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½% delivered.
- POTASSIUM BICHROMATE.—Quoted 4½d. per lb., delivered U.K. or c.i.f. Irish ports with an allowance of 2½% for minimum 2½ tons to be taken during six months.
- POTASSIUM CARBONATE, 96/98%.—Offered from the Continent £25 10s. per ton, c.i.f. U.K. Spot material quoted £36 10s. per ton, ex store.
- POTASSIUM CHLORATE, 99½/100% POWDER.—Quoted £22 15s. per ton, c.i.f. U.K. ports.
- POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.
- POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5½d. per lb. ex wharf.
- POTASSIUM PRUSSATE (YELLOW).—Offered for prompt shipment from the Continent at 6½d. per lb., ex wharf. Spot material quoted 7d. per lb., ex store.
- SODA, CAUSTIC.—Powdered, 98/99%, now £17 10s. per ton in drums, £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums; 70/72%, £14 2s. 6d. per ton in drums, all carriage paid buyer's station, minimum 4-ton lots, for contract 10s. per ton less.
- SODIUM ACETATE.—On offer for prompt delivery at about £21 5s. per ton, ex store.
- SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.
- SODIUM BICHROMATE.—Price during first six months of this year, 3½d. per lb., delivered U.K. or c.i.f. Irish ports, less 2½% for contract of minimum 2½ tons.
- SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton. Extra light soda ash, £7 13s. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.
- SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.
- SODIUM NITRATE.—Price now £10 10s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, usual extras for small quantities and refined qualities.
- SODIUM SULPHATE (SALTCAKE).—Prices, 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.
- SODIUM SULPHIDE.—Prices for home consumption. Solid, 60/62%, £9 per ton; broken, 60/62%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra. Prices for this year unchanged.
- SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton; ex store.
- ZINC CHLORIDE, 98%.—British material now quoted £22 10s. per ton, f.o.b. U.K. ports.
- ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

### Leicestershire (L. & N.) Coal Distillation Issue of Shares

FORMED in 1928 as a private company, Leicestershire (L. and N.) Coal Distillation, Ltd., undertook the erection of the first complete commercial unit of the "L. and N." process in England by arrangement with the parent "L. and N." Coal Distillation Co. As a public company the Leicestershire undertaking now has an authorised capital of £900,000, divided into £450,000 in £1 ordinaries and 1,800,000 deferred shares of 5s. Subscription was invited on Monday to 330,000 of the former and an equal number of the deferred shares, both at par. The issue was fully subscribed.

The programme includes the erection of a further nine units, making ten in all, capable of treating 450,000 tons of coal per annum. In order to ensure adequate supplies, control has been acquired of the New Lount Colliery, which is modern and well equipped, and which is laid out for an output of 2,000 tons a day; the present output is about 1,200 tons daily. The prospectus embodied reports upon the "L and N" process, setting forth the quantities of crude oil and residual fuel obtained.

## Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, February 7, 1929.

ALTHOUGH there is a fair volume of inquiry about still in the local chemical market, there is a continued tendency among the majority of buyers to limit the size of their parcels and, as far as possible, to cover their prospective needs only over a comparatively short period. Contract deliveries, however, are maintained at a fair rate, and prices in pretty well every section of the market display a steady to firm feeling.

### Heavy Chemicals

In the case of phosphate of soda, there is a quiet business going through in this material, with current offers ranging from about £12 to £12 5s. per ton. Hypsulphite of soda is well held, and there is a moderate trade being done; the photographic quality is quoted at up to £15 10s. per ton and the commercial about £9. There has been no apparent improvement in the demand for sulphide of sodium, though prices keep steady at round £8 per ton for the commercial product and £9 10s. for the 60/65 per cent. concentrated solid material. Caustic soda is quite firm at from £12 15s. to £14 per ton, according to quality, and a fair amount of business in this section is going through. Inquiry for chlorate of soda is on the quiet side and quotations are easy at from 2½d. to 2¾d. per lb. There is a moderate demand about for bicarbonate of soda, offers of which are still in the neighbourhood of £10 10s. per ton. Bleaching powder is in fair request, with prices ranging from about £7 5s. to £7 10s. per ton, according to make. Alkali is maintained at £6 per ton and is in quietly steady demand. Bichromate of soda is attracting a fair amount of attention, quotations remaining on the basis of 3½d. per lb. There is a moderate amount of business passing in the case of prussiate of soda, values of which keep very firm at from 4½d. to 5½d. per lb., according to quantity. With regard to salt cake, buying interest in this section of the market is still rather subdued, but at round £2 12s. 6d. per ton there has been little change in the price situation.

There is a quietly steady demand about for yellow prussiate of potash, and prices are firm at from 6½d. to 7½d. per lb. Permanganate of potash continues to meet with only a moderate amount of inquiry, with the B.P. quality at 5½d. to 5¾d. per lb. and the commercial grade at 5½d. Offers of chlorate of potash are easy in tendency, although not actually changed on the week at about 3d. per lb., business being on the quiet side. A fair amount of buying interest is being shown in bichromate of soda at 4½d. per lb. The demand for caustic potash is on a quietly steady scale, with prices well held at from £33 5s. per ton for prompt delivery of one to five-ton lots. With regard to carbonate of potash, current offers of this range from £26 to £26 5s. per ton.

A moderate demand has been reported for arsenic during the past week on the basis of £16 5s. per ton, at the mines, for white powdered, Cornish makes. There is a steady business passing still in sulphate of copper and the price tendency in this section is distinctly strong at round £28 per ton, f.o.b. The acetates of lime are in quiet demand, but values are well held at £9 per ton for the brown quality and £17 10s. to £17 15s. for the grey. The lead acetates are fairly steady at round £40 per ton for the white and £39 10s. for the brown, nitrate of lead being rather slow at up to £35 per ton.

### Acids and Tar Products

Citric acid is not attracting a great deal of attention at the moment, although quotations keep up pretty well at from 2s. 1½d. to 2s. 3d. per lb. There is a moderate demand about for tartaric acid at 1s. 4d. per lb. Oxalic acid is attracting a certain amount of attention at up to £1 12s. per cwt. Acetic acid is firm and there is a fair weight of business passing in glacial at £66 per ton and in 80 per cent. commercial at about £36.

Creosote oil is still easy in tendency at from 4d. to 4½d. per gallon, with demand for shipment still comparatively restricted. There has been a little improvement in the position of pitch, offers of which are more or less normal at £1 15s. per ton, f.o.b. Solvent naphtha remains steady at 1s. 1½d. to 1s. 2d. per gallon, and a fair business in this is reported. Crude 60's carbolic meets with a moderate sale at 1s. 10d. per gallon, with crystal still fairly active at 6½d. per lb., f.o.b.

## Company News

**STAVELEY COAL AND IRON CO.**—The directors have declared an interim dividend of 2½ per cent., actual, on the ordinary shares on account of the year ending June 30 next.

**ENGLISH VELVET AND CORD DYERS' ASSOCIATION.**—A final dividend of 6 per cent. on the ordinary shares is recommended by the directors, making a total of 8 per cent. for the year ended December 31, 1928, as compared with a final of 5 per cent., making 7 per cent. for the year 1927.

**JURGENSEN.**—A dividend for the half-year ended December 31, 1928, on the guaranteed 7 per cent. cumulative participating preference shares, at the rate of 7 per cent. per annum was payable on February 1, 1929, under deduction of income-tax at rate of 4s. in £ to all persons registered as holders of shares at close of business on January 17, 1929.

**FAIRY DYES, LTD.**—The profit for the half-year ended November 30 last amounted to £10,037, from which are deducted directors' and auditors' fees and income-tax of £2,220, leaving £7,817. After meeting the preference dividend, the directors recommend a dividend at the rate of 12½ per cent. per annum on the ordinary shares; writing down preliminary expenses account by £1,232, leaving £2,609 to be carried forward.

**JOHN KNIGHT.**—For the year ended November 30 last, the report states that the balance to credit of profit and loss account on working is £175,003, which, with £45,835 brought forward, makes a total of £220,838. After allowing for preferred ordinary dividend directors propose a dividend on ordinary shares at 20 per cent. per annum, carrying forward £55,838. The increase in ordinary share capital from £70,000 to £200,000, which was sanctioned by shareholders during the year, has been duly effected.

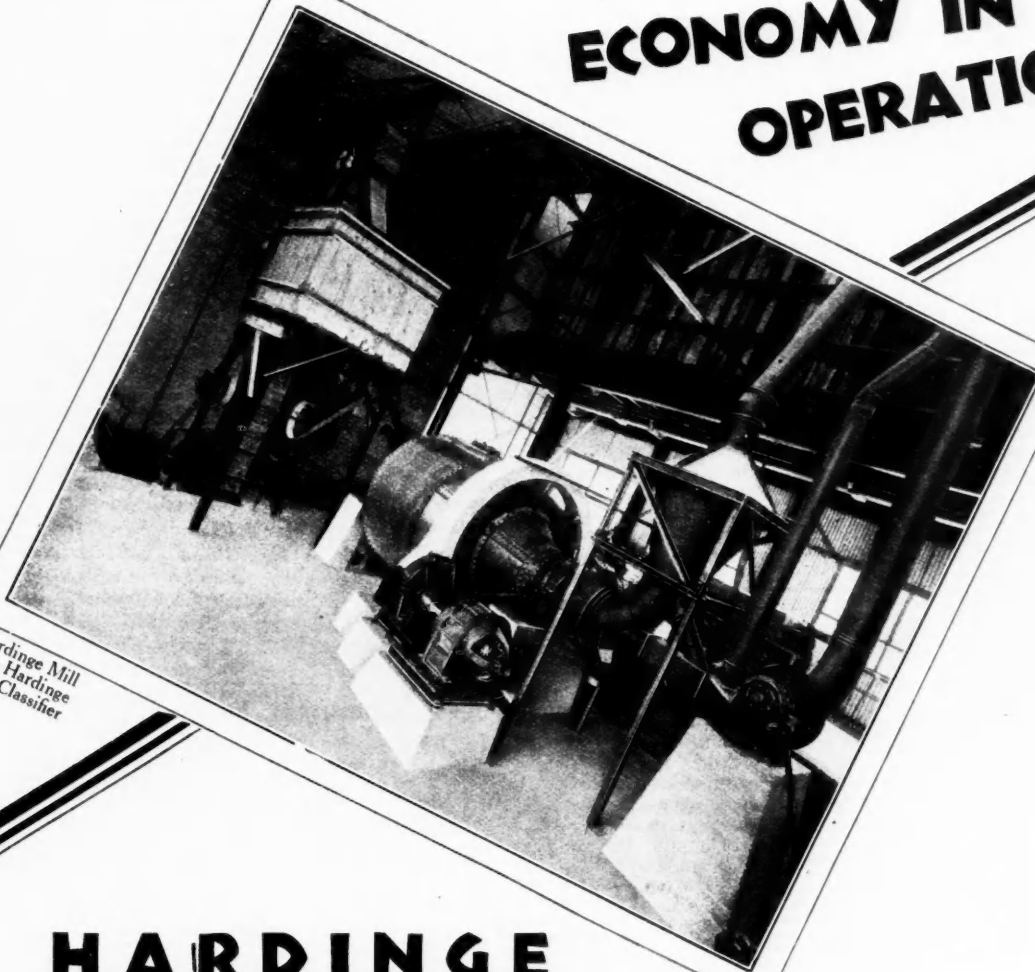
**SOUTH METROPOLITAN GAS CO.**—The accounts for 1928 show that total receipts amounted to £4,372,725 (against £4,887,976 for 1927), and the expenditure to £3,810,925 (against £4,326,007), leaving a profit of £561,800 (against £561,969). This profit excludes interest receipts of £940 and the dividend of £32,500 on South Suburban Gas stock, but is arrived at before meeting interest charges, which total £153,068 (against £148,987). The dividend for the year on the ordinary stock is again 6½ per cent., which permits of an allocation of £82,624 to the employees' co-partnership fund.

**ACETATE AND ACETATE PRODUCTS (FOREIGN RIGHTS).**—The statutory report states that the total number of shares allotted is 1,182,500 shares of 2s. each, of which 182,500 shares have been allotted, credited as fully paid up as consideration for sale to company *inter alia* of certain patents, and 1,000,000 shares have been allotted payable wholly in cash and are fully called. Cash received in respect of shares issued wholly for cash is £73,113. Payments to January 14, 1929, comprise: To vendors under agreements dated October, 22, 1928, patents and pending patents, £50,000; on account of preliminary expenses, including stamp duties, underwriting commission and brokerage, £15,893; travelling expenses, £4; printing and stationery, £6; postages, etc., £3; general expenses, £7 16s.; leaving cash at bank and in hand, £7,199. Preliminary expenses are estimated at £20,855.

**GAS LIGHT AND COKE CO.**—The total receipts for 1928 amounted to £11,554,842 (against £13,051,224 for 1927), while expenses amounted to £9,701,322 (against £11,314,235), leaving a profit of £1,853,520 (against £1,736,989). To this is added £121,577 brought forward. After meeting interest charges, placing £50,000 (against nil) to special purposes fund, deducting the June half-year dividends, and contributing £20,000 to the redemption fund (against £15,000), there remains an available balance of £830,100. The dividend for the latter half of the year on the Ordinary stock is £2 16s. per cent. (making £5 11s. per cent. for the year, against £5 0s. 8d. per cent.). Allowing for this dividend, and also those for the past half-year, on the 4 per cent. preference and 3½ per cent. maximum stocks, and a further sum of £20,000 (the same) to be contributed to the redemption fund, there will remain £158,658 to be carried forward.

A REVIEW of the chemical and allied industries of Italy has just been issued by the chemical division of the United States Bureau of Foreign and Domestic Commerce, Washington, D.C., U.S.A. Copies may be obtained from the Bureau at a cost of 10 cents each.

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## Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

### County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

MATTHEWS AND WILSON, LTD., 6, Cole Street, S.E., manufacturing chemists. (C.C., 9/2/29.) £12 12s. 6d. December 13.

### London Gazette, &c.

#### Bankruptcy Information

DEES, William Lough, "Amil" Mills, Feethams, Darlington, and formerly at Lough-Dees Mills, Croxdale, near Durham, chemical merchant and manufacturer. (R.O., 9/2/29.) Receiving order, January 30, creditor's petition. First meeting, February 15, 2.30 p.m., Official Receiver's Offices, 80, High Street, Stockton-on-Tees. Public examination, February 28, 10.30 a.m., Court House, Bridge Road, Stockton-on-Tees.

### New Companies Registered

CONTINENTAL TINTEX AND DYE PRODUCTS, LTD., 56, Moorgate, London, E.C.2. Registered as a "public" company on January 31. Nom. capital, £200,000 in 5s. shares. To adopt agreements (a) with Park and Tilford, Ltd., and (b) with British Tintex and Dye Products, Ltd., and to carry on the business of manufacturers, producers, importers, exporters, merchants, and brokers of dyes, dyestuffs, chemicals, drugs, varnishes, colours, industrial and other preparations and compounds, etc. Directors: Alfred Dunhill, David A. Schulte, Vernon Dunhill, and Ernest J. Allistone.

KIRKPATRICK AND LANDER, LTD., 179, West George Street, Glasgow. Registered in Edinburgh on January 30. Nom. capital £10,000 in £1 shares. Chemical merchants, drysalts, oil and colourmen, importers and manufacturers, etc. Directors: J. B. Lander, 179, West George Street, Glasgow; J. M. Watson and W. Nelson.

E. C. LONGMATE, LTD. Registered February 1. Nom. capital £10,000 in £1 shares. To acquire the business of a manufacturing, agricultural and horticultural chemist carried on by E. C. Longmate at Railway Passage, and at Austin Street, King's Lynn, Norfolk, and at Terrington St. John, Norfolk, and to carry on the same and the business of manufacturers of and dealers in chemical manures, fertilisers, insecticides, fungicides, and fertilisers made from fish and fish offal, etc. Directors: E. C. Longmate, "Keslyn," South Woolton, King's Lynn, and Mrs. F. M. Longmate.

MEDIKOL, LTD., Imperial Oil Works, Bloom Street, Salford, Lancs. Registered January 31. Nom. capital £100 in £1 shares. Manufacturers and refiners of and dealers in oils and greases, petroleum, spirits, varnishes, soaps, chemicals, oil importers and exporters, etc.

NATURAL PRODUCTS, LTD., 40, Furnival Street, London, E.C. Registered January 30. Nom. capital, £6,000 in 3,000 preference and 3,000 ordinary shares of £1 each. To acquire the business carried on by W. G. Asquith at 40, Furnival Street, E.C., as the Natural Products Co., and to carry on the business of manufacturers of and dealers in medicinal salts, drugs, chemicals, secret preparations, patent medicines, foods, essences, perfumes, soaps, and toilet requisites manufacturing and wholesale and retail chemists, druggists and distillers, etc. Directors: A. Laidlaw and W. G. Asquith.

## New Chemical Trade Marks

### Applications for Registration

This list has been specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks, and Designs.

Opposition to the Registration of the following Trade Mark can be lodged up to February 26, 1929.

#### LYSAGELS.

494,206. Class 3. Chemical substances prepared for use in medicine and pharmacy. Solido Chemical, Ltd., 16, St. Helen's Place, Bishopsgate, London, E.C.3; manufacturers.—August 17, 1928.

Opposition to the registration of the following Trade Marks can be lodged up to February 28, 1929.

#### CAPORIT.

489,785. Class 2. Chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Bayer Products, Ltd., 31 to 34, Basinghall Street, London, E.C.2; merchants and manufacturers. March 23, 1928. (To be Associated. Sect. 24.)

#### CAPORIT.

489,711. Class 3. Chemical substances prepared for use in medicine and pharmacy. Bayer Products, Ltd., 31 to 34, Basinghall Street, London, E.C.2; merchants and manufacturers. March 21, 1928. (To be Associated. Sect. 24.)

#### UBROMINT.

498,213. Class 3. Chemical substances prepared for use in medicine and pharmacy. Bayer Products, Ltd., 31 to 34, Basinghall Street, London, E.C.2; merchants and manufacturers. December 18, 1928.

### Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

MEDICINAL OILS.—The Egyptian Department of Public Health is calling for tenders, to be presented in Cairo by March 16, for the supply of medicinal oils required during the year commencing May 1, 1929. (Reference No. B.X. 5,081.)

ZINC OXIDE, LEAD MINIMUM, ETC.—The Roumanian State River Navigation Service is calling for tenders, to be presented in Galatz by March 1, 1929, for the supply of zinc oxide, iron tar, putty, lead minimum, linseed oil, red and black paint. (Reference No. B.X. 5083.)

FATTY ACIDS AND OILS FOR SOAP MAKING.—A well-established French firm at Nantes desires to secure the representation of British exporters. (Reference No. 87.)

DRY COLOURS.—A firm of wholesale dealers in paints, oils, etc., in Western Canada desire to purchase their supplies of dry colours direct from manufacturers in the United Kingdom. (Reference No. 82.)

### Large Order for Oil-Filtering Plant

WHAT is probably the largest single order for oil filtering ever placed has been secured from the Central Electricity Board by The Stream-Line Filter Co., Ltd., of 45, Horseferry Road, Westminster, London, with whom has been placed the contract for filter plant to deal with the transformer and switch oils at each of the thirteen stations included in the Central Scottish grid scheme. The value of the order is understood to approach £20,000, and the scheme for the handling and storage of the dirty and clean oil, which has been prepared by Kennedy and Donkin in conjunction with the Central Electricity Board, is a very complete and effective one. The Stream-Line Filter Co.'s purification plant is based upon the "stream-line" principle of edge-filtration, and is distinguished from many other plants designed for this particular purpose by the fact that the plant is a simple static one, quite independent of centrifugal principles.

